

DIGITAL-LOGIC

smart embedded computers

TECHNICAL USER'S MANUAL FOR:

MPC40/A/B/C

MPC41



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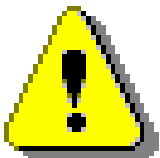


REVISION HISTORY:

MPC40/ A/B	BIOS Vers.	MPC 41	BIOS Vers.			Doc. Version	Date/Initials:	Modification: Remarks, News:
V0.3	V0.1		V0.1			V0.1	08.2003 KUF	Initial Version
V0.3			V0.1			V1.0	11.2003 KUF	Production Release
V0.3			V0.1			V1.1	11.2003 HAK	New pictures, dimension drawing
V0.3			V0.1			V1.2	01.2004 KUF	Driver Installations
V0.4	V2.0		V2.0			V1.2A	05.2004 DAR	Cover modify
V0.4	V2.1		V2.1			V1.2B	05.2004 DAR	Bios update V2.1
V0.4	V2.2	V0.2	V2.2			V1.2C	06.2004 DAR	Bios update V2.2
V0.4	V2.3	V0.2	V2.3			V1.2D	07.2004 DAR	Bios update V2.3
V0.4	V2.4	V0.2	V2.4			V1.2E	08.2004 DAR	Bios update V2.4
V0.4	V2.5	V0.2	V2.5			V1.3	09.2004 DAR	Bios download, MPC41, driver installations, software, startup modes, Bios 2.5
V0.4	V2.6	V0.2	V2.6			V1.3A	10.2004 DAR	Bios update V2.6
V0.4	V2.6	V0.2	V2.6			V1.3B	10.2004 DAR	Driver installation
V0.5	V2.7	V0.2	V2.7			V1.3C	12.2004 DAR	Bios update V2.7 , drawings
V0.5	V2.7	V0.2	V2.7			V1.3D	01.2005 DAR	Minor corrections
V0.5	V2.8	V0.2	V2.8			V1.3E	01.2005 DAR	Bios update V2.8
V0.5	V2.8	V0.2	V2.8			V1.3F	03.2005 DAR	Software inst. minor corrections
V0.5	V2.8	V0.2	V2.8			V1.3G	04.2005 DAR	Driver inst. minor corrections
V0.5	V2.9	V0.3	V2.9			V1.3H	05.2005 DAR	Bios update 2..9
V0.5	V2.9	V0.3	V2.9			V1.3I	06.2005 DAR	Assembly options update
V0.6	V2.9	V0.3	V2.9			V1.3J	11.2005 DAR	New bios setup pictures
V0.6	V3.01	V0.3	V3.01			V1.3K	02.2006 DAR	Bios 3.01
V0.6	V3.03	V0.3	V3.03			V1.3L	03.2006 DAR	Bios 3.03
V0.6	V3.04	V0.3	V3.04			V1.3M	03.2006 DAR	Sound driver, Bios V3.04
V0.6	V3.04	V0.3	V3.04			V1.3N	06.2006 DAR	Chapter 3.7 supplemented
V1.0	V3.05	V0.3	V3.05			V1.3O	11.2006 DAR	Bios V3.05
MPC40/ A	BIOS Vers.	MPC 41	BIOS Vers.	MPC 40B/C	BIOS Vers.	Doc. Version	Date/Initials:	Modification:Remarks, News:
V1.0	V3.05	V0.3	V3.05	V0.6	V3.07	V1.4	02.2007 DAR	MPC40C added
V1.0	V3.09	V0.3	V3.09	V0.6	V3.07	V1.4A	07.2007 DAR	Bios download / Bios V3.09 Remote Function
V1.0	V3.12	V0.3	V3.12	V0.6	V3.07	V1.4B	06.2008 WAS	BIOS V3.12 / Linux Driver for BT878/ EMV Certificate
V1.0	V3.12	V0.3	V3.12	V0.6	V3.07	V1.4C	08.2008 WAS	Warning against opening housing which voids warranty

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**ATTENTION**

1. All information in this manual and the product are subject to change without prior notice.
2. Read this manual prior installation of the product.
3. Read the security information carefully prior installtion of the product.

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1 PREFACE

This document is for integrators and programmers of systems based on the MICROSPACE-Computer family. It contains information on hardware requirements, interconnections, and details of how to program the system. The specifications given in this manual were correct at the time of printing; advances mean that some may have changed in the meantime.

The information contained in this document is, to the best of our knowledge, entirely correct. However, DIGITAL-LOGIC AG, cannot accept liability for any inaccuracies or the consequences thereof, of for any liability arising from the use or application of any circuit, product described herein, as seen fit by DIGITAL-LOGIC AG without further notice.

1.1 Trademarks

Digital-Logic, Digital-Logic-Logo, MICROSPACE, smartModule are registered trademarks owned worldwide by Digital-Logic AG Luterbach (Switzerland). In addition, this document may include names, company logos, and trademarks which are registered trademarks and are therefore proprietary to their respective owners.

1.2 Disclaimer

DIGITAL-LOGIC AG makes no representations or warranties with respect to the contents of this manual and specifically disclaims any implied warranty of merchantability or fitness for any particular purpose. DIGITAL-LOGIC AG shall under no circumstances be liable for incidental or consequential damages or related expenses resulting from the use of this product, even if it has been notified of the possibility of such damage. DIGITAL-LOGIC AG reserves the right to revise this publication from time to time without obligation to notify any person of such revisions

1.3 Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

1.4 Who should use this Product

- Electronic engineers with know-how in PC-technology.
- Without electronic know-how we expect you to have questions. This manual assumes, that you have a general knowledge of PC-electronics.
- Because of the complexity and the variability of PC-technology, we can't give any warranty that the product will work in any particular situation or combination. Our technical support will help you to may find a solution.
- Pay attention to the electrostatic discharges. Use a CMOS protected workplace.
- Power supply OFF when you are working on the board or connecting any cables or devices.

1.5 How to use this Manual

This manual is written for the original equipment manufacturer (OEM) who plans to build computer systems based on the single board MICROSPACE-PC. It provides instructions for installing and configuring the this board, and describes the system and setup requirements.

1.6 Recycling Information

All components within this products fulfills the requirements of RoHS.
The product is soldered with a lead free process.

1.7 Technical Support

1. Contact your local Digital-Logic Technical Support in your country.
 2. Use Internet Support Request form on <http://support.digitallogic.ch/> -> embedded products ->New Support Request
- ➔ Support requests will only be accepted with detailed informations about the product (BIOS-, Board- version) !

1.8 Limited Two Year Warranty

DIGITAL-LOGIC AG warrants the hardware and software products it manufactures and produces to be free from defects in materials and workmanship for two year following the date of shipment from DIGITAL-LOGIC AG, Switzerland. This warranty is limited to the original purchaser of product and is not transferable.

During the two year warranty period, DIGITAL-LOGIC AG will repair or replace, at its discretion, any defective product or part at no additional charge, provided that the product is returned, shipping prepaid, to DIGITAL-LOGIC AG. All replaced parts and products become property of DIGITAL-LOGIC AG.

Before returning any product for repair, direct customers from Digital-Logic AG Switzerland are required to register a RMA number (Return Material Autorisation number) in the Support Center on <http://support.digitallogic.ch/>

All other customer have to contact their local distributors for returning defects materials.

This limited warranty does not extend to any product which has been damaged as a result of accident, misuse, abuse (such as use of incorrect input voltages, wrong cabling, wrong polarity, improper or insufficient ventilation, failure to follow the operating instructions that are provided by DIGITAL-LOGIC AG or other contingencies beyond the control of DIGITAL-LOGIC AG), wrong connection, wrong information or as a result of service or modification by anyone other than DIGITAL-LOGIC AG. Neither, if the user has not enough knowledge of these technologies or has not consulted the product manual or the technical support of DIGITAL-LOGIC AG and therefore the product has been damaged.

Except, as expressly set forth above, no other warranties are expressed or implied, including, but not limited to, any implied warranty of merchantability and fitness for a particular purpose, and DIGITAL-LOGIC AG expressly disclaims all warranties not stated herein. Under no circumstances will DIGITAL-LOGIC AG be liable to the purchaser or any user for any damage, including any incidental or consequential damage, expenses, lost profits, lost savings, or other damages arising out of the use or inability to use the product.

1.9 Explanation of Symbols



CE Conformity

This symbol indicates that the product described in this manual is in compliance with all applied CE standards. Please refer also to the section "Applied Standards" in this manual.



Caution, Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material. Please refer also to the section "High Voltage Safety Instructions" on the following page.



Warning, ESD Sensitive Device!

This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times. Please read also the section "Special Handling and Unpacking Instructions" on the following page.



Warning!

This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your material.



Note...

This symbol and title emphasize aspects the reader should read through carefully for his or her own advantage.



Danger

This symbol and title warn of general hazards from mechanical, electrical, chemical failure. This may endanger your life/health and/or result in damage to your material.

1.10 Applicable Documents and Standards

The following publications are used in conjunction with this manual. When any of the referenced specifications are superseded by an approved revision, that revision shall apply. All documents may be obtained from their respective organizations.

- Advanced Configuration and Power Interface Specification Revision 2.0c, August 25, 2003 Copyright © 1996-2003 Compaq Computer Corporation, Intel Corporation, Microsoft Corporation, Phoenix Technologies Ltd., Toshiba Corporation. All rights reserved. <http://www.acpi.info/>
- ANSI/TIA/EIA-644-A-2001: Electrical Characteristics of Low Voltage Differential Signaling (LVDS) Interface Circuits, January 1, 2001. <http://www.ansi.org/>
- ANSI INCITS 361-2002: AT Attachment with Packet Interface - 6 (ATA/ATAPI-6), November 1, 2002. <http://www.ansi.org/>
- ANSI INCITS 376-2003: American National Standard for Information Technology – Serial Attached SCSI (SAS), October 30, 2003. <http://www.ansi.org/>
- Audio Codec '97 Revision 2.3 Revision 1.0, April 2002 Copyright © 2002 Intel Corporation. All rights reserved. <http://www.intel.com/labs/media/audio/>
- Display Data Channel Command Interface (DDC/CI) Standard (formerly DDC2Bi) Version 1, August 14, 1998 Copyright © 1998 Video Electronics Standards Association. All rights reserved. <http://www.vesa.org/summary/sumddcci.htm>
- ExpressCard Standard Release 1.0, December 2003 Copyright © 2003 PCMCIA. All rights reserved. <http://www.expresscard.org/>
- IEEE 802.3-2002, IEEE Standard for Information technology, Telecommunications and information exchange between systems–Local and metropolitan area networks–Specific requirements – Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications. <http://www.ieee.org>
- IEEE 802.3ae (Amendment to IEEE 802.3-2002), Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications, Amendment: Media Access Control (MAC) Parameters, Physical Layers, and Management Parameters for 10 GB/s Operation. <http://www.ieee.org>
- Intel Low Pin Count (LPC) Interface Specification Revision 1.1, August 2002 Copyright © 2002 Intel Corporation. All rights reserved. <http://developer.intel.com/design/chipsets/industry/lpc.htm>
- PCI Express Base Specification Revision 1.1, March 28, 2005, Copyright © 2002-2005 PCI Special Interest Group. All rights reserved. <http://www.pcisig.com/>
- PCI Express Card Electromechanical Specification Revision 1.1, March 28, 2005, Copyright © 2002-2005 PCI Special Interest Group. All rights reserved. <http://www.pcisig.com/>
- PCI Local Bus Specification Revision 2.3, March 29, 2002 Copyright © 1992, 1993, 1995, 1998, 2002 PCI Special Interest Group. All rights reserved. <http://www.pcisig.com/>
- PCI-104 Specification, Version V1.0, November 2003. All rights reserved. <http://www.pc104.org>
- PICMG® Policies and Procedures for Specification Development, Revision 2.0, September 14, 2004, PCI Industrial Computer Manufacturers Group (PICMG®), 401 Edgewater Place, Suite 500, Wakefield, MA 01880, USA, Tel: 781.224.1100, Fax: 781.224.1239. <http://www.picmg.org/>
- Serial ATA: High Speed Serialized AT Attachment Revision 1.0a January 7, 2003 Copyright © 2000-2003, APT Technologies, Inc, Dell Computer Corporation, Intel Corporation, Maxtor Corporation, Seagate Technology LLC. All rights reserved. <http://www.sata-io.org/>

1.11 For Your Safety

Your new Digital-Logic product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Digital-Logic product, you are requested to conform with the following guidelines.



Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.



Caution, Electric Shock!

Before installing your new Digital-Logic product, always ensure that your mains power is switched off. This applies also to the installation of piggybacks or peripherals. Serious electrical shock hazards can exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing work.



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

1.12 RoHS Commitment

DIGITAL-LOGIC AG is committed to develop and produce environmentally friendly products according to the Restriction of Hazardous Substances (RoHS) Directive (2002/95/EC) and the Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) established by the European Union. The RoHS directive was adopted in February 2003 by the European Union and came into effect on July 1, 2006. It is not a law but a directive, which restricts the use of six hazardous materials in the manufacturing of various types of electronic and electrical equipment. It is closely linked with the Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC, which has set targets for collection, recycling and recovery of electrical goods and is part of a legislative initiative to solve the problem of huge amounts of toxic e-waste.

Each European Union member state is adopting its own enforcement and implementation policies using the directive as a guide. Therefore, there could be as many different versions of the law as there are states in the EU. Additionally, non-EU countries like China, Japan, or states in the U.S. such as California may have their own regulations for green products, which are similar, but not identical, to the RoHS directive.

RoHS is often referred to as the "lead-free" directive but it restricts the use of the following substances:

- Lead
- Mercury
- Cadmium
- Chromium VI
- PBB and PBDE

The maximum allowable concentration of any of the above mentioned substances is 0.1% (except for Cadmium, which is limited to 0.01%) by weight of homogeneous material. This means that the limits do not apply to the weight of the finished product, or even to a component but to any single substance that could (theoretically) be separated mechanically.

1.12.1 RoHS Compatible Product Design

All DIGITAL-LOGIC standard products comply with RoHS legislation.

Since July 1, 2006, there has been a strict adherence to the use of RoHS compliant electronic and mechanical components during the design-in phase of all DIGITAL-LOGIC standard products.

1.12.2 RoHS Compliant Production Process

DIGITAL-LOGIC selects external suppliers that are capable of producing RoHS compliant devices. These capabilities are verified by:

1. A confirmation from the supplier indicating that their production processes and resulting devices are RoHS compliant.
2. If there is any doubt of the RoHS compliancy, the concentration of the previously mentioned substances in a produced device will be measured. These measurements are carried out by an accredited laboratory.

1.12.3 WEEE Application

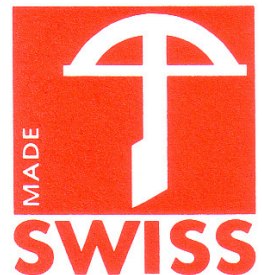
The WEEE directive is closely related to the RoHS directive and applies to the following devices:

- Large and small household appliances
- IT equipment
- Telecommunications equipment (although infrastructure equipment is exempt in some countries)
- Consumer equipment
- Lighting equipment – including light bulbs
- Electronic and electrical tools
- Toys, leisure and sports equipment
- Automatic dispensers

It does not apply to fixed industrial plants and tools. The compliance is the responsibility of the company that brings the product to market, as defined in the directive. Components and sub-assemblies are not subject to product compliance. In other words, since DIGITAL-LOGIC does not deliver ready-made products to end users the WEEE directive is not applicable for DIGITAL-LOGIC. Users are nevertheless encouraged to properly recycle all electronic products that have reached the end of their life cycle.

1.13 *Swiss Quality*

- 100% Made in Switzerland
- DIGITAL-LOGIC is a member of "Swiss-Label"
- This product was **not** manufactured by employees earning piecework wages
- This product was manufactured in humane work conditions
- All employees who worked on this product are paid customary Swiss market wages and are insured
- ISO 9000:2001 (quality management system)



1.14 The Swiss Association for Quality and Management Systems

The Swiss Association for Quality and Management Systems (SQS) provides certification and assessment services for all types of industries and services. SQS certificates are accepted worldwide thanks to accreditation by the Swiss Accreditation Service (SAS), active membership in the International Certification Network, IQNet, and co-operation contracts/agreements with accredited partners.

www.sqs.ch

The SQS Certificate ISO 9001:2000 has been issued to DIGITAL-LOGIC AG, the entire company, in the field of development, manufacturing and sales of embedded computer boards, embedded computer modules and computer systems. The certification is valid for three years at which time an audit is performed for recertification.



THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and SQS
hereby certify that the organization

DIGITAL-LOGIC AG
CH-4542 Luterbach

Certified area

Whole Company

Field of activity

Development, manufacturing and sales of Embedded Computer Boards, Embedded Computer Modules and Computer Systems

has implemented and maintains a
Management System
which fulfills the requirements of the following standard

ISO 9001:2000

Scope Nos: 19, 33
Issued on: 2008-01-18
Validity date: 2011-01-17
Registration Number: **CH-14740**




René Wasmer
President of IQNet


Theodor Zahner
Managing Director SQS



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FONDONORMA Venezuela HKQAA Hong Kong China ICONTEC Colombia IMNC Mexico Inspecta Certification Finland
IRAM Argentina JQA Japan KFO Korea MSZT Hungary Nemko AS Norway NSAI Ireland PCBC Poland QMI Canada
Quality Austria Austria RR Russia SAI Global Australia SHI Israel SIQ Slovenia SIRIM QAS International Malaysia
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Certificate

SQS herewith certifies that the company named below has a management system which meets the requirements of the normative base specified below.

DIGITAL-LOGIC

DIGITAL-LOGIC AG
CH-4542 Luterbach

Certified area

Whole Company

Field of activity

**Development, manufacturing and sales of
Embedded Computer Boards, Embedded
Computer Modules and Computer Systems**

Normative base

ISO 9001:2000 Quality Management System

Swiss Association for Quality and
Management Systems SQS
Bernstrasse 103, CH-3052 Zollikofen
Issue date: January 18, 2008

This SQS Certificate is valid up to
and including January 17, 2011
Scope numbers 19, 33
Registration number 14740

X. Edelmann, President SQS

T. Zahner, Managing Director SQS



1.15 EC – Declaration of conformity MPC40/A/B & MPC41



EG – Konformitätserklärung EC-Declaration of Conformity

Dokument Nr.: 010/01
Document No.

Monat, Jahr: 10/2004
Month, Year:

Hersteller: DIGITAL-LOGIC AG
Manufacturer

Anschrift: Nordstrasse 11/F
Address CH-4542 Luterbach, Switzerland

Produktbezeichnung: Microspace-PC40 / Microspace-PC40A / Microspace-PC40B / Microspace-PC41
Name of product, type or model

Diese EG-Konformitätserklärung ersetzt die Konformitätserklärung 89/336/EWG vom 03.05.1989
This EC-Declaration of conformity replaces the EC-Declaration of conformity No. 89/336/EWG of 03.05.1989

	Nummer / Kurztitel Number / Titel	Eingehaltene Vorschriften Observed regulations
<input checked="" type="checkbox"/>	EN 55022	Limits and methods of measurement of radio disturbance characteristics of information technology equipment. Class-B
<input checked="" type="checkbox"/>	EN 60555-2	Disturbances in supply systems caused by household appliances and similar electrical equipment „Harmonics“
<input checked="" type="checkbox"/>	EN 50081-1	Generic emission standard part 1 Residual, commercial, and light industry
<input checked="" type="checkbox"/>	EN 50082-1	Generic immunity standard part 1 Residual, commercial, and light industry
<input checked="" type="checkbox"/>	EN 50081-2	Generic emission standard part 2 Industrial environment
<input checked="" type="checkbox"/>	EN 50082-2	Generic immunity standard part 2 Industrial environment
<input checked="" type="checkbox"/>	ICE/EN 60601-1:2001 A1 & A2	Medical Device Directive 93/94/EEC
<input checked="" type="checkbox"/>	ICE 60601-1-2	Medical Device Directive 93/94/EEC
<input checked="" type="checkbox"/>	CE-marking	EC conformity marking

☒ Zutreffendes ist angekreuzt

☒ marked, if applicable

The manufacturer declares that the above mentioned product is manufactured according to the ISO9001 defined procedures and additionally in compliance with the ANNEX V of the R&TTE-Directive 99/05/EC. The presumption of conformity with the essential requirements regarding council devices 99/05/EC is ensured.

Zur Erfüllung obiger Normen sind gefilterte Kabel, gefilterte Netzteile und ein EMV konformes Gehäuse notwendig. (Siehe dazu das Produkte Handbuch)
To fulfill the above norm filtered cables, filtered power supply, and an EMV conformed housing is necessary.
(See also the product manual)

Aussteller: Leiter Qualitätsmanagement
Issuer Director Quality Management

Ort, Datum: CH-Luterbach, 18. Oktober 2004
Place, date

Konformitätsbeauftragter der
DIGITAL-LOGIC AG
Representative for conformity

Felix Kunz (CEO & Leiter Qualitätsmanagement)
(CEO & Director Quality Management)

1.16 EMV Certificate MPC40/A/B & MPC41



Test Report

Confidential

4 Summary of test results and remarks

4.1 EMC emission

The measurements have been applied according to EN 61000-6-3:2001; EN 55022/A2:2003; EN 60601-1-2:2001

Requirements / Test	Standard	Range	Limit	Test result	Chap.
Harmonic current	EN 61000-3-2:2000	0 - 2 kHz	Class A	not tested	5.1
Flicker	EN 61000-3-3/A1:2001	0 - 2 kHz	According Standard	pass	5.2
Conducted disturbance	EN 55022/A2:2003	0.15 - 30 MHz	Class B	pass	5.3
Radiated disturbance	EN 55022/A2:2003	30 - 1000 MHz	Class B	pass	5.4

4.2 EMC immunity

The tests have been applied according to EN 61000-6-2:2001; EN 55024/A2:2003; EN 60601-1-2:2001

Requirement / Test	Standard	Range / Level	Criterion	Test result	Chap.
Electrostatic discharge	EN 61000-4-2/A2:2000	± 6 kV (Contact) ± 8 kV (Air)	B	pass	6.1
Radiated RF-field	EN 61000-4-3/A1:2000	10 V/m	A	pass	6.2
900 MHz pulse modulated	EN 61000-4-3/A1:2000	10 V/m	A	pass	6.2
Electrical fast transients (Burst)	EN 61000-4-4/A1:2000	±2 kV (AC) ±1 kV (DC) ±1 kV (Signal, etc.)	B	pass	6.3
Surge	EN 61000-4-5/A1:2000	±2 kV (L-PE) ±1 kV (L-N) ±0.5 kV (Signal)	B	pass	6.4
Conducted disturbances	EN 61000-4-6/A1:2000	10 V	A	pass	6.5
Power frequency magnetic field	EN 61000-4-8:2001	30 A/m	A	not tested	6.6
Voltage dips and interruptions	EN 61000-4-11:2001	>95 % / 10 ms 30% / 10 ms 60% / 100 ms 60% / 500 ms 70% / 500 ms >95% / 5 s	B B C C C C	pass	6.7

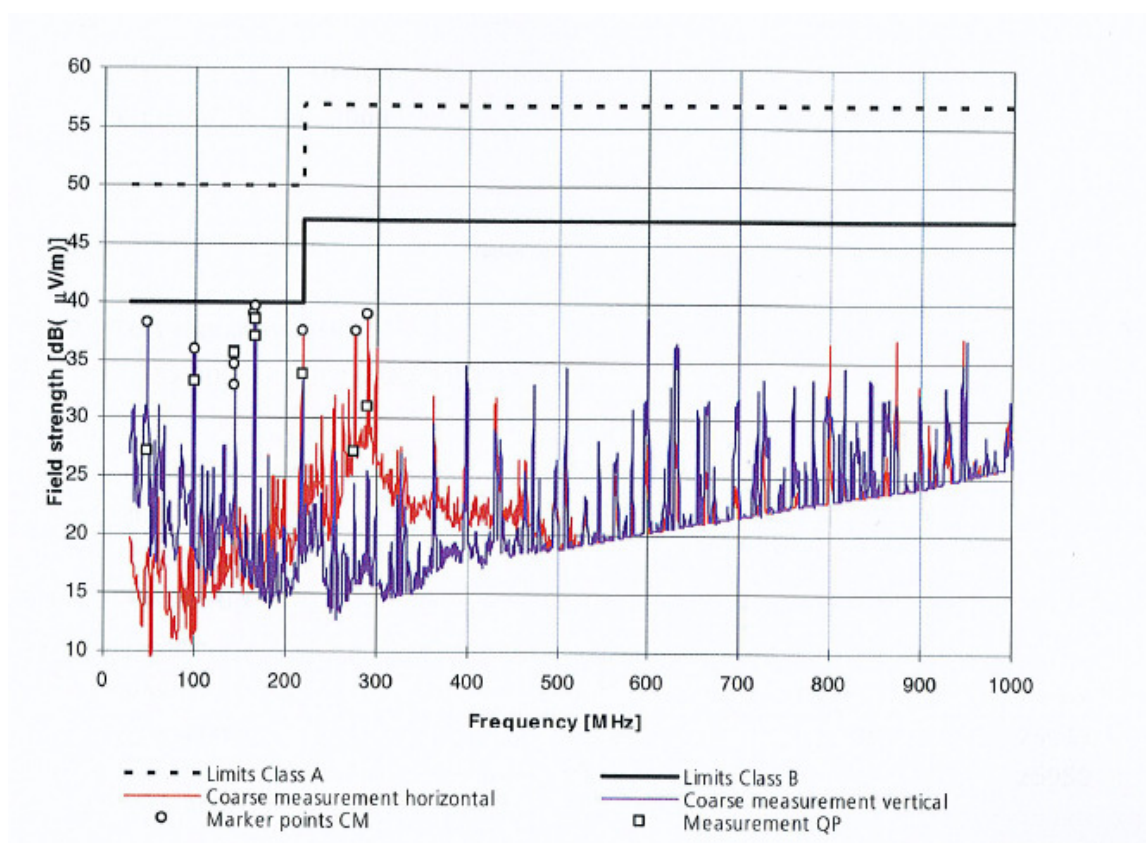
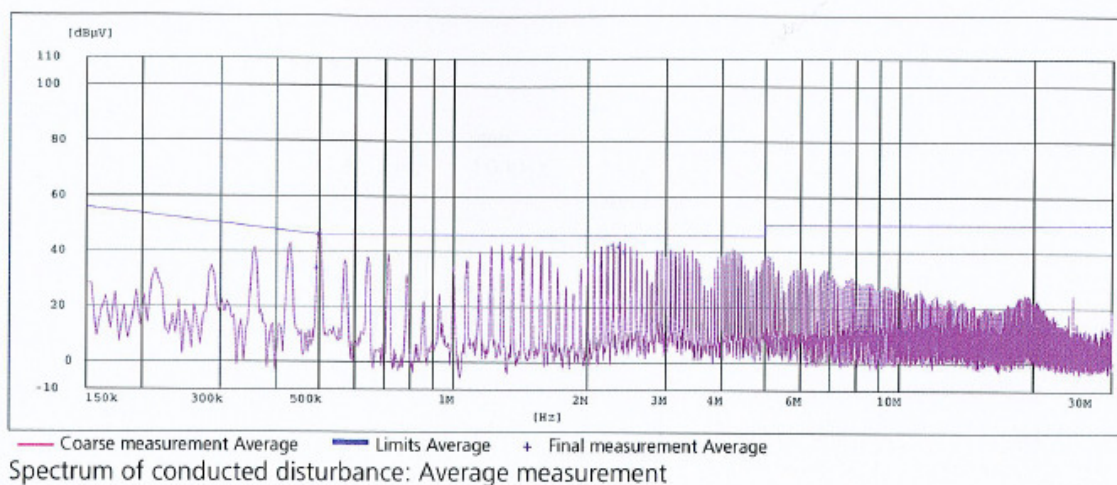
Swisscom Ltd., Bern
Innovations
Test laboratory INO-EEC
CH-3050 Bern

Test item: Microspace PC MPC 40

Issue date: 15.4.2004
Doc-ID: INO-EEC 10389-1

9/32

1.16.1 EMV Test Diagram, Class B MPC40/A/B & MPC41



2 INTRODUCTION



Attention!

If the red seal on the *rear* plate is damaged, meaning the system itself was opened, **then the warranty is void.**

Expansions can only be made by the manufacturer at the factory – the expansions then carry their own 2 year warranty.

2.1 System Overview

The MICROSPACE-PC40 is a miniaturized PC system incorporating the major elements of a PC/AT compatible computer. It includes standard PC/AT compatible elements, such as:

- PENTIUM- CPU
- 2048k L2-Cache
- SDRAM Memory 128 – 1024Mbyte (SODIMM144)
- Harddisk: up to 60Gbyte
- Compactflash Typ-II socket frontside
- Direct-X compatible Videocontroller XVGA with up to 64Mbyte Videomemory
- 2 channel video (CRT1, CRT2 or DVI)
- USB controller up to 5 channels
- Soundcontroller 2-6 channels and SPDif-Output
- COM1, COM2, LPT1, PS/2 (MS&KB)
- Firewire IEEE1394 controller
- LAN 100/10Base-T controller
- Monitoring of all supplies
- Extended temperature range available
- CD/DVD-RW/ROM Drive integrated
- 12/24Volt Supply Input
- Fanless Low Power system (option)

- Optional: Wireless Network integrated (option)
- Optional up to 3 channel LAN (2./3. LAN controller)

For more details, see chapter 2.3

2.2 Operatingsystem Compatibility

The MICROSPACE-PC40/A/B/41 was tested with the following operating systems.

Drivers are available from Digital-Logic or the manufacturer of the specific peripheral controller:

- WINDOWS 2000
- WINDOWS XP
- LINUX

2.3 Differences between MPC40, MPC40A, MPC40B, MPC40C, MPC41

The product has different functions:

Option	MPC40	MPC40A	MPC40B	MPC40C	MPC41
LAN-Port A	yes	yes	yes	Yes	yes
LAN-Port B	no	yes	no	-	no
LAN-Port C	no	yes	no	-	no
Mouse Keyboard 1xPS/2	yes	no	yes	Yes	yes
Mouse Keyboard 2xPS/2	no	yes	no	-	no
Svideo Input	yes	no	yes	yes	yes
Svideo Output	yes	no	yes	yes	yes
Framegrabber	yes	no	yes	3x	yes
MPEG2+AC3 Encoder	no	no	no	No	yes
USB 2.0 x5	yes	no	yes	Yes	yes
USB 2.0 x4	no	yes	no	No	no
Firewire IEEE1394 x2	yes	no	yes	No	yes
CD-Drive	no	yes	no	No	no
CD/DVD-Drive	yes	no	no	No	yes
CD-RW/DVD-Drive	no	no	yes	Yes	no
PC-CARD TYPI/TYP II (2Slots)	no	no	yes	No	no
Line Output 5.1	yes	no	yes	No	yes
Line Output AC3	no	no	no	No	yes
Line Input Stereo	yes	no	yes	yes	yes

2.4 Assembly Options

The product has different assembly options.

Ask the factory for the detailed information about the current available options and combination of options.

MPC40:

Option:	Part.No		Comments:
SM855-C300 (0.6GHz)	807356	D	Replace SM855-738 (1.4GHz)
SM855-C373 (1GHz)	807357	D	Replace SM855-738 (1.4GHz)
SM855-P755 (2GHz)	807359	U	Replace SM855-738 (1.4GHz)
Wireless LAN	813087	U	WLAN IntelPro2200 incl Antenna, Must be ordered with the MPC,
Harddiskdrive 80GB	807365	U	Replace standard HDD 2.5" 40GB by 80GB
Harddiskdrive 20GB E28	807366	U	Replace standard HDD 2.5" 40GB by 20GB extended temperature – 20 °C to +85 °C
Compact Flash	807xxx	U	See price list
DDR-RAM 1024MB	807363	U	Replace DDR-RAM SODIMM Module 512MB by 1024MB
DVD-R-RW/CD-RW-Drive	807371	U	Replace DVD/CD-RW Combo drive by DVD-R-RW/CD-RW-Drive, Software Nero (800121) included
No DVD-R/CD-RW drive	807376	D	Remove DVD-R/CD-RW Drive and replace front cover
No Harddisk drive	807377	D	Remove HDD 40GB
COM 1 RS485	807381	U	Upgrade the serial COM1 port to RS422/485
COM 2	807382	U	Add one RS232 port as COM2 -> Remove the LPT1 connector and mount 1x DSUB9 connector
AC Adapter 90W	807385	D	Remove AC Adapter
PC104 Mount option	Tdb	U	Factory mount of PC/104 ISA BUS connector and PC/104 peripheral card.
Customized front- or back cover	807330	U	See price list

U = Upgrade, D = Downgrade

MPC40A:

Option:	Part.No		Comments:
SM855-C300 (0.6GHz)	807356	D	Replace SM855-738 (1.4GHz)
SM855-C373 (1GHz)	807357	D	Replace SM855-738 (1.4GHz)
SM855-P755 (2GHz)	807359	U	Replace SM855-738 (1.4GHz)
Customized front cover	807330	U	See price list
Wireless LAN	813087	U	WLAN IntelPro2200 incl Antenna, Must be ordered with the MPC,
Harddisk drive 80GB	807365	U	Replace standard HDD 2.5" 40GB by 80GB
Harddisk drive 20GB E28	807366	U	Replace standard HDD 2.5" 40GB by 20GB extended temperature – 20 °C to +85 °C
Compact Flash	807xxx	U	See price list
DDR-RAM 512MB	807361	U	Replace DDR-RAM SODIMM Module 256MB by 512MB
DDR-RAM 1024MB	807362	U	Replace DDR-RAM SODIMM Module 256MB by 1024MB
DVD/CD-RW-Drive	807370	U	Replace CD-R by DVD/CD-RW Combo drive, Software Nero (800121) included
No Harddisk drive	807377	D	Remove HDD 40GB
No CD-Rom Drive	807375	D	Remove CD-R Drive and replace front cover
COM 1 RS485	807381	U	Upgrade the serial COM1 port to RS422/485
COM 2	807382	U	Add one RS232 port as COM2 -> Remove the LPT1 connector and mount 1x DSUB9 connector
AC Adapter 90W	807385	D	Remove AC Adapter
PC104 Mount option	Tdb	U	Factory mount of PC/104 ISA BUS connector and PC/104 peripheral card.

U = Upgrade, D = Downgrade

Option:	Part.No		Comments:
SM855-C300 (0.6GHz)	807356	D	Replace SM855-738 (1.4GHz)
SM855-C373 (1GHz)	807357	D	Replace SM855-738 (1.4GHz)
SM855-P755 (2GHz)	807359	U	Replace SM855-738 (1.4GHz)
Customized front- and back cover	807330	U	See price list
Wireless LAN	813087	U	WLAN IntelPro2200 incl Antenna, Must be ordered with the MPC,
Harddiskdrive 80GB	807365	U	Replace standard HDD 2.5" 40GB by 80GB
Harddiskdrive 20GB E28	807366	U	Replace standard HDD 2.5" 40GB by 20GB extended temperature – 20 °C to +85 °C
Compact Flash	807xxx	U	See price list
DDR-RAM 1024MB	807363	U	Replace DDR-RAM SODIMM Module 512MB by 1024MB
DVD-R-RW/CD-RW-Drive	807371	U	Replace DVD/CD-RW Combo drive by DVD-R-RW/CD-RW-Drive, Software Nero (800121) included
No Harddisk drive	807377	D	Remove HDD 40GB
No DVD-R/CD-RW drive	807376	D	Remove DVD-R/CD-RW Drive and replace front cover
COM 1 RS485	807381	U	Upgrade the serial COM1 port to RS422/485
COM 2	807382	U	Add one RS232 port as COM2 -> Remove the LPT1 connector and mount 1x DSUB9 connector
AC Adapter 90W	807385	D	Remove AC Adapter
PC104 Mount option	Tdb	U	Factory mount of PC/104 ISA BUS connector and PC/104 peripheral card.

MPC40C:

[illegible]

22

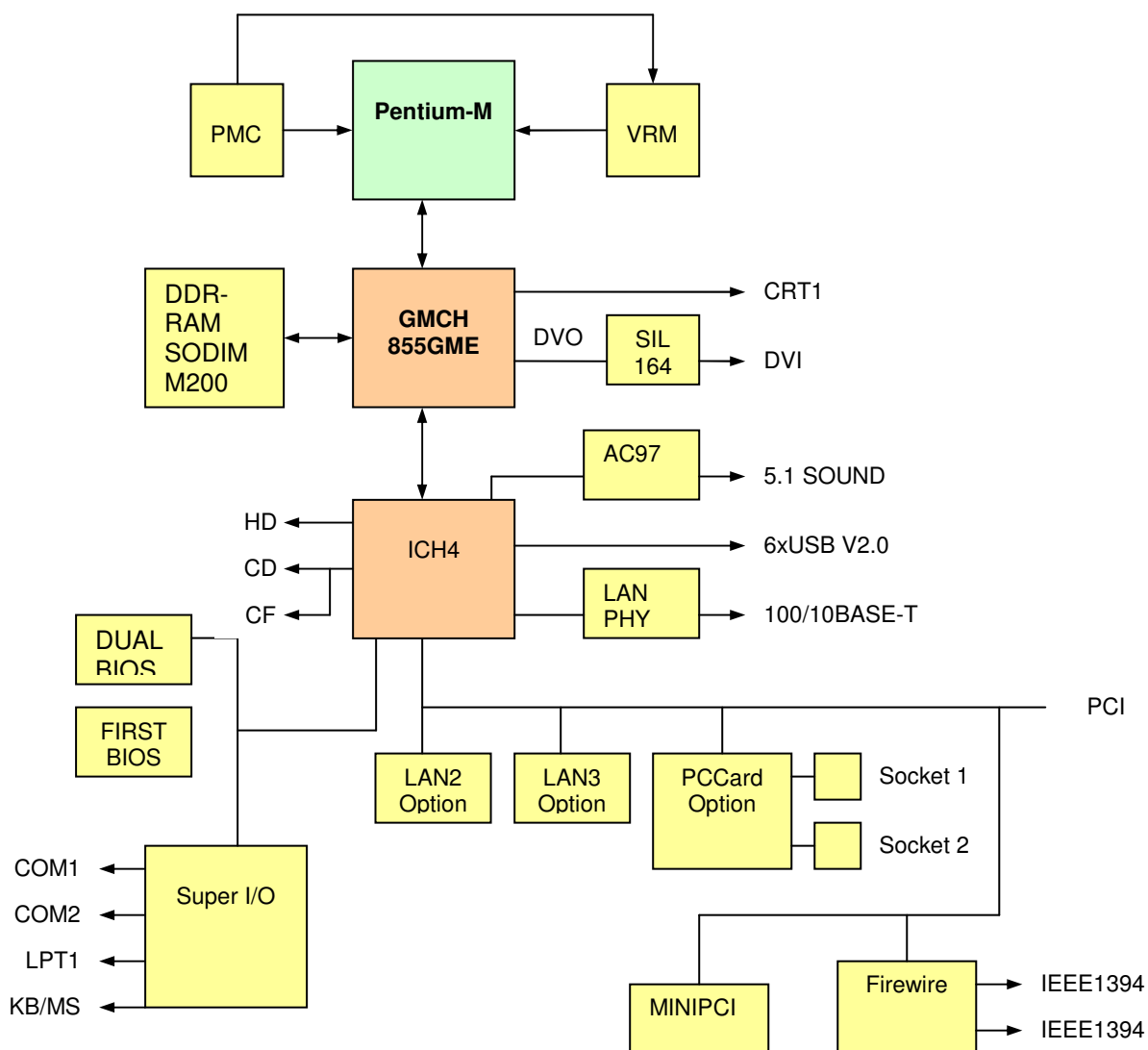
MPC41:

Option:	Part.No		Comments:
SM855-C300 (0.6GHz)	807356	D	Replace SM855-738 (1.4GHz)
SM855-C373 (1GHz)	807357	D	Replace SM855-738 (1.4GHz)
SM855-P755 (2GHz)	807359	U	Replace SM855-738 (1.4GHz)
Customized front- and back cover	807330	U	See price list
Wireless LAN	813087	U	WLAN IntelPro2200 incl Antenna, Must be ordered with the MPC,
DDR-RAM 1024MB	807363	U	Replace DDR-RAM SODIMM Module 512MB by 1024MB
DVD-R-RW/CD-RW-Drive	807371	U	Replace DVD/CD-RW Combo drive by DVD-R-RW/CD-RW-Drive, Software Nero (800121) included
Compact Flash	807xxx	U	See price list
No Harddisk drive	807377	D	Remove HDD 40GB
COM 1 RS485	807381	U	Upgrade the serial COM1 port to RS422/485
COM 2	807382	U	Add one RS232 port as COM2 -> Remove the LPT1 connector and mount 1x DSUB9 connector
AC Adapter 90W	807385	D	Remove AC Adapter
No DVD/CD-RW drive	807376	D	Remove DVD/CD-RW Drive and replace front cover

U = Upgrade, D = Downgrade

2.5 Functional Block Diagram

The diagram provide additional information concerning board functionality.



2.6 Technical Specification

CPU:	Specification
MPC40	Pentium-M
Compatibility:	8086 – Pentium
1. Level Cache:	16k data and 16k code
2. Level Cache:	1024/2048kByte
Socket:	SmartCore855
Clock	1.0GHz up to 1.6GHz
Pentium4 Performance:	2.4GHz up to 3.0GHz
FSB	400MHz
Powermanagement	None
FPU:	Integrated

Chipset:	Specification
Nordbridge	GMCH 855GME INTEL
Southbridge	ICH4M INTEL
LAN	82C559 INTEL 1x (on MPCxxA version 3x)
Audio	Integrated AC97
Firewire IEEE1394	TI43C22 (only on MPCxx version)
Video	INTEL Extreme 3 Grafics with integrated 64Mbyte
Framegrabber/TV-Input	BT878 (only on MPCxx version)

Memory	Specification
Main Memory	DDR-SDRAM, 64Bit, up to 512Mbyte in DDR-SODIMM200 socket
Flash-BIOS	256kByte Flash
Setup EEPROM	2kByte for CMOS-backup in batterless applications
Flash-VideoBIOS:	Serial-Flash
Video RAM	16 – 64Mbyte

Video controller	Specification
Controller	Intel 855GME
Videomemory	16-64Mbyte
Channel 1	CRT VGA up to 1600 x 1280 pixels
Channel 2	DVI
Bootup-Resolution	640 x 480 / 800 x 600 / 1024 x 768 selectable
2D-Grafic	Integrated accelerator
3D-Grafic	Integrated accelerator
Direct-X Version	9
PnP	PnP-BIOS with VESA-Detect of the monitors

External Interface	Specification
Videointerfaces	CRT1, DVI
TV-Interfaces	S-Video Input (only on MPCxx version)
USB V2.0	4 channels (rear), 1 channel (front)
IEEE1394	Firewire 2 channels (only on MPCxx version)
LPT1:	LPT1
COM1:	RS232 (option: RS422/485)
COM2:	Internal (option: RS422/485)
Keyboard:	PS/2
Mouse:	PS/2
Audio:	Stereo I/O

Powersupply:	
Input:	Nom. 12V / 24VDC (range 10V to 28VDC)
Protection:	Load dump resistant, wrong polarity resistant, EMI filtered
Spec.	MIL-STD-1275 compliant

Power Consumption	Specification
At 12V	Typical 2.2 Amp., at standard operation with 1.6GHz CPU Clock
Standby	Typical 100mA at 12Volt
Poweroff	Typical 2mA at 12Volt

Physical Characteristics	Specification
Dimensions:	Length: 260mm
	Depth: 160 mm
	Height: 66 mm
Weight:	3kg

Operating Environment	Specification
Relative Humidity:	5 - 90% non condensing IEC68-2-30 at -20° to +50°C operating
Vibration operating:	IEC68-2-6 10-50Hz, 0.075mm and 55-500Hz, 1.0G
Vibration nonoperating:	IEC68-2-6 10-50Hz, 0.15mm and 55-500Hz, 2.0G
Shock operating:	IEC68-2-27 10G, 11ms ½ sine
Shock nonoperating:	IEC68-2-27 50G, 11ms, ½ sine
Altitude	IEC68-2-13 4571meter operating
Temperature operating	IEC68-2-1,2,14: 5°C to +40°C (1.6GHz) 5°C to +50°C (1.0GHz)
Temperature storage	IEC68-2-1,2,14: -40°C to +85°C

EMI / EMC Tests		Specification
EMC emission EN61000-6-2:2001		
Conducted disturbance	EN55022	Class B
Radiated disturbance	EN55022	Class B
EMC immunity EN61000-6-2		
Electrostatic discharge (ESD)	EN61000-4-2	Voltage = 4kV contact / 8kV air Criteria A
Radiated RF-Field	EN61000-4-3	Level = 10V/m Criteria A
Electrical fast transients (Burst)	EN61000-4-4	Grade 2: DC-Powerlines = 1000V (5/50ns) Grade 2: AC-Powerlines = 2000V (5/50ns) Grade 2: Signallines = 500V (5/50ns) Criteria B
Surge	EN61000-4-5	Grade 2: DC-Powerlines = 1kV, (1.2/50us) Grade 2: AC-Powerlines = 2kV, (1.2/50us) Criteria B
Conducted disturbances	EN61000-4-6	Voltage = 10V coupled by case Criteria A
Security:		
e1:	Planned	
UL	Not planned	
ETL 301	Not planned	
SEV		
Safety	AR385-16	

2.7 Packing List

Control the packing list after opening the box:

- MICROSPACE-PCX
- Users Manual
- CD with drivers and documentations



3 SAFETY REGULATIONS

The verification of the safety is followed to the guideline adapted from the US Army Communication and Electronics Command Supplement (119 version) 1 to AR385-16.



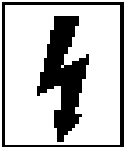
This sign indicates an important information.



This sign indicates an information that may injure the health.



This sign indicates an information that may destroy the device.



This sign indicates voltages above 28Volts.

3.1 ***Safety: PowerOn Indicator***

The green Power indicator is located in the front of the computersystem [MIL-STD-1472D].

3.2 ***Safety: Coded and Marked Connectors***

All connectors (plugs and receptacles) are coded and marked to prevent insertion of the wrong plug into a receptacle or other mating unit [MIL-STD-1472D]. Depending of the mounted replicator unit, the connectors are PC-Style, DSUB or MIL versions.

The male connectors are deenergized when disconnected [MIL-STD-454M].

3.3 ***Safety: Protection of the Supply Input Current***



The computersystem protects the internal supply from overcurrent by an internal fuse of 6.3amp. In case of an overcurrent the fuse opens the main circuit and interrupts the fault current [MIL-STD-454M]

3.4 ***Safety: Wrong Polarisation on the Power Input***



The supply input is protected against wrong polarisation of the supply input with a series diode. The diode withstands up to a voltage of 28Volts.

3.5 Safety: Protection of the Output Currents

The computer system limits the current of all peripheral supply outputs with fuses or with electronic current limiters. The following table shows the maximum available currents at each peripheral connector:

	Nominal max. current:	Max.Current
USB:	0.5 Amp. @ 5V	1 Amp. with resistor limiter
KB/MS:	0.1 Amp. @ 5V	0.2 Amp. with polyfuse
VGA:	0.1 Amp. @ 5V	0.2 Amp. with polyfuse
Firewire	0.5 Amp. @ 12V	2 Amp. with electronic limiter

3.6 Safety: Load Dump Protection in 12V/24V systems



Currently there are two types of TVS devices integrated in the computer system for the 12/24V automotive systems to protect against load dump: silicon-based single-junction Zener diodes and zinc-oxide-based metal oxide varistors (MOV). Even though Zener diodes and MOVs operate on different physical mechanisms, they both offer a typical 28V clamp voltage for the 12/24V systems.

Input Varistor: B72220S300K (Infineon) $V_{break}=30V$

3.7 Safety: Ground Potential



t.b.d

3.8 Safety: Power On/Off Switch

The power on/off switch does not cut all power of the complete equipment. In the OFF-state is a microcontroller still working, to supervise the wakeup events (switch, remote-on, wake-on-LAN, wake-on-events) [MIL STD 454M]

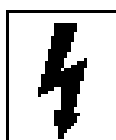
The system is consuming a power of approx. 10mW in the poweroff state.

The power switch is clearly identified and located on the front panel [MIL-STD-545M]

The power switch is protected from accidental contact, which causes a power on/off. The power switch must be activated over a defined periode 1-3sec.

When the system is opened, the replicator unit must be removed and in this way no external power supply is available. Take care, that the internally installed batteries are even connected to the system.

3.9 Safety: Batteries Inside the Device



The system has one integrated backup lithium batteries (RTC). The batteries compartments are not vented. The system enclosure prevents the operator from an exploding battery cell.

3.10 Safety: Protection against Over Temperature



The computer system integrates temperature sensitive components like:

- Harddisk (max. 55°C)
- The CPU with a max. junction temperature of 105°C

In the BIOS, the temperature level of the thermal protection of the CPU may be selected and enabled. If enabled, the systems will reduce the CPU-Clock automatically, if the temperature rises above the defined limit.

Do not cover the device with paper, textiles or other objects. This disables the passive cooling (cooling ribs). The minimum space between the cooling ribs and the next object is 50mm on each side. Make sure to allow enough airflow to the computersystem, when the device is assembled.

Protect the computersystem from solar radiation or other thermal energy exposure.

Do never place the running computer system in a closed case or box. Otherwise the inside air will heat up over the maximum temperature and the system will be destroyed.

Clean the surface of the computer system from dust, oil and other isolating materials, to prevent a reduction of the cooling efficiency.

3.11 Mechanical Safety: Safe Assembly and Mounting



The computer system must be fixed with a minimum of 8 screws within the 2 or 4 nuts. It is very dangerous to place the device on the seat of a car, while driving. In case of an accident, the device will hit the window or a passenger.

Do never drill some mounting holes into the chassis of the computersystem. The inside electronics or hard-disk may be damaged. Use only the mounting nuts for mechanic assembly.

3.12 Environmental Safety: At 25°C No Hot Surfaces



The computer system running at +25°C ambient temperature shows no surfaces or other operating elements with temperatures above +60°C [MIL-STD-454M].

3.13 Environmental Safety: No Release of Toxic's



As long as the computer system is used in the specified operating temperature range, no toxic, corrosive, or explosive fumes or vapors are exposed. [MIL-STD-454M].

3.14 Environmental Safety: Laser Devices



The assembled CD/DVD-Drive includes a laser class 1 device.

3.15 *Environmental Safety: Noise Emmission*



This computer system is a low noise system. The level is less than 35 dbA.

3.16 *Environmental Safety: Hazardous Atmospheres*



The computer system must not be used in a hazardous atmosphere, because the system is not prevented from accidental ignition. Do never use the system in explosive gas or vapor, combustible dusts or ignitable fibers and flyings.

3.17 *Environmental Safety: Humidity and Spray Water*



The computer system is not protected from spray water.
The protection is IP40.

3.18 *Safety: Independent Software*



The computer system is divided into 3 different parts of software, running each on an own microcontroller or CPU. All 3 systems are communicating over the SM-Bus (system management bus).

1. Power management CPU and software: Always running, even the system is powered off
2. Battery charger controller is running allways
3. Pentium-CPU main processor controlled from the power management CPU

3.19 *Safety: Recycling the computersystem*



Disposal:
Never dispose of old batteries or the hole computer system domestic waste. Return it to the manufacturer.



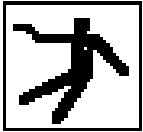
as

3.20 *Safety: Static Electricity*



Excessive static electricity can damage components. Before you handle the chassis or its components, use the grounding wrist strap provided with the system to discharge static electricity. Instructions for using the wrist strap are printed on the strap's envelope.
Handle the components by the handles or front panel to help prevent accidental damage caused by static discharge.

3.21 Safety: Operators Security



It is important to protect yourself and your equipment before you perform any of the procedures outlined in this manual. When making changes to the configuration, power off the system and disconnect all power cords from their source.

To avoid damage or injury, always power off the system and disconnect all power cords from their source before handling the equipment. To help prevent accidental damage caused by static discharge, use a grounding wrist strap or other static-dissipating device when handling the equipment.

Only qualified, experienced electronics service personnel should access and handle the equipment.



4 FUNCTIONS

4.1 *Operating elements on the frontside:*

4.1.1 MPC40



4.1.2 MPC40A



4.1.3 MPC40B



4.1.4 MPC40C

4.1.5 MPC41



4.1.6 Connectors on frontside

- (1) USB Connector (only with standard model)
- (2) IrDA Transmitter/Receiver (only with standard model)

The MPCxxA version (red front) has no connectors or interfaces on the frontside.

4.1.7 Indicator LED's on the frontside

- (1) PRG indicator (green):
no activity at this time
- (2) Power ON indicator (green):
power off: LED is off, power on: LED is on
- (3) CD Drive activity indicator (red):
blinking = activity
- (4) Harddisk activity indicator (red):
blinking = activity

4.1.8 Operating elements

- (1) ON / OFF Switch (press for 4 sec = off / 2 sec = on the computer)
- (2) SLEEP-Switch (only with the MPC40 version):
Toggles between suspend and resume function.
- (3) RESET-Switch: (only for service)

4.1.9 ON /OFF switch

- A: Press 3sec. to power on
- B: Press 3sec. to power off



4.2 Operating elements on the rearside:

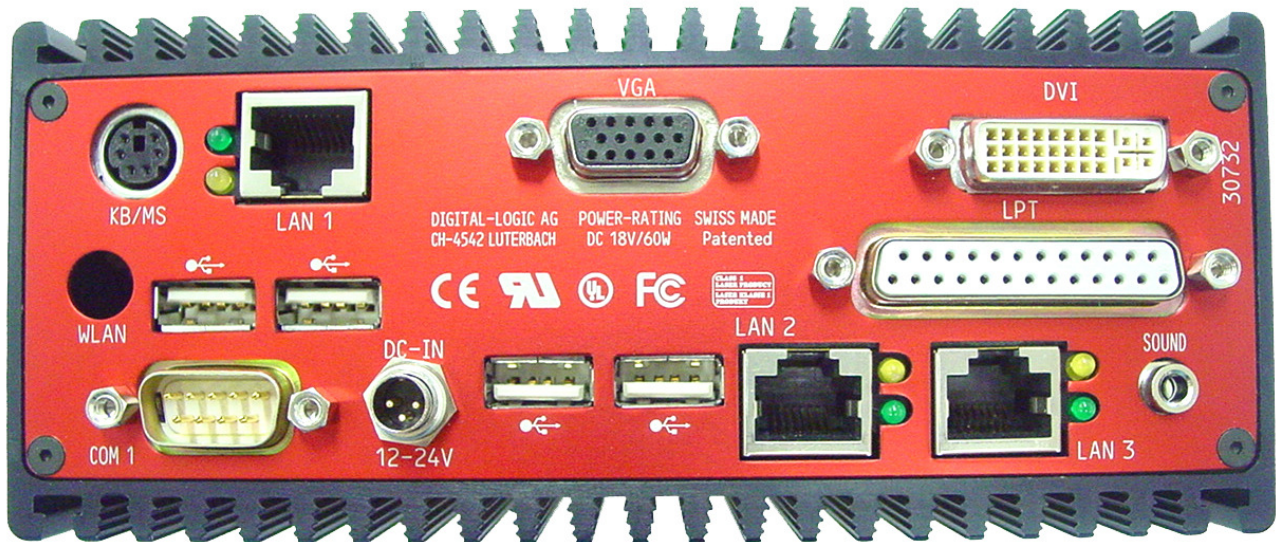
4.2.1 MPC40



Connectors:

KB/MS:	Keyboard direct connectd For keyboard/mouse it is a Y-Cable needed
LAN-Port A:	With activity / link – LED for port A
S-VHS In:	Video-Input
VGA:	Analog VGA channel 1
S-VHS-Out:	TV Output SVHS
DVI:	DVI-D
WLAN	(Antenna for WLAN only if ordered as Option)
USB2	2.Connector USB
USB3	3.Connector USB
Firewire A	Firewire channel A
Firewire B	Firewire channel B
LPT1	Lineprinter Interface
COM1	Serial Interface RS232
DC-IN:	Supply DC Input with remote on/off
USB4	4. Conenctor USB
USB5	5. Connector USB
Audio Line	Audio Line Input
Stereo Out	Subwoofer only on MPC40
Stereo Out	Front only on MPC40
Stereo Out	Rear = normal stereo output for active speaker
MIC	Audio Input for Microphone

4.2.2 MPC40A



Connectors:

KB/MS:	Keyboard direct connectd For keyboard/mouse it is a Y-Cable needed
LAN-Port A:	With activity / link – LED for port A
VGA:	Analog VGA channel 1
DVI:	DVI-D
WLAN	Antenna for WLAN only if ordered as Option)
USB2	2.Connector USB
USB3	3.Connector USB
LPT1	Lineprinter Interface
COM1	Serial Interface RS232
DC-IN:	Supply DC Input with remote on/off
USB4	4. Conenctor USB
USB5	5. Connector USB
LAN-Port B:	With activity / link – LED for port B
LAN-Port C:	With activity / link – LED for port C
Sound:	Audio Line Out

4.2.3 MPC40B



Connectors:

KB/MS:	Keyboard direct connectd For keyboard/mouse it is a Y-Cable needed
LAN-Port A:	With activity / link – LED for port A
S-VHS In:	Video-Input
VGA:	Analog VGA channel 1
S-VHS-Out:	TV Output SVHS
DVI:	DVI-D
WLAN	(Antenna for WLAN only if ordered as Option)
USB2	2.Connector USB
USB3	3.Connector USB
Firewire A	Firewire channel A
Firewire B	Firewire channel B
LPT1	Lineprinter Interface
COM1	Serial Interface RS232
DC-IN:	Supply DC Input with remote on/off
USB4	4. Conenctor USB
USB5	5. Connector USB
Audio Line	Audio Line Input
Stereo Out	Subwoofer
Stereo Out	Front
Stereo Out	Rear = normal stereo output for active speaker
MIC	Audio Input for Microphone

4.2.4 MPC40C

4.2.5 MPC41



Connectors:

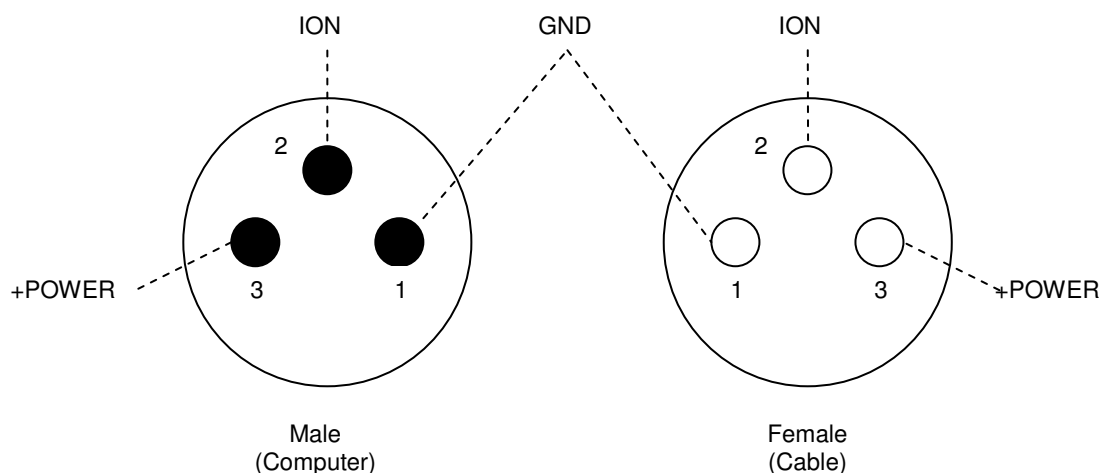
KB/MS:	Keyboard direct connectd For keyboard/mouse it is a Y-Cable needed
LAN-Port A:	With activity / link – LED for port A
S-VHS In:	Video-Input
VGA:	Analog VGA channel 1
S-VHS-Out:	TV Output SVHS
DVI:	DVI-D
WLAN	(Antenna for WLAN only if ordered as Option)
USB2	2.Connector USB
USB3	3.Connector USB
Firewire A	Firewire channel A
Firewire B	Firewire channel B
LPT1	Lineprinter Interface
COM1	Serial Interface RS232
DC-IN:	Supply DC Input with remote on/off
USB4	4. Conenctor USB
USB5	5. Connector USB
Audio Line	Audio Line Input
Stereo Out	Subwoofer
Stereo Out	Front only
Stereo Out	Rear = normal stereo output for active speaker
MIC	Audio Input for Microphone

4.3 Power Supply

(1) AC-Adapter:



4.3.1 Power Supply Connector



Signaldefinition:

+ Power

GND

ION

10 – 28Volt Powersupply

0V or Ground of the powersupply

Remote ON Input or IGNITION-Input , 8V – 28V level on this Input will switch ON the computersystem.

4.4 *DC-PowerInput specifications*

4.4.1 Nominal DC-PowerInput voltage

The nominal DC-powerinput is within the range of: 10Volt to 28Volt.
That means the device may be used in 12V or 24V battery supplies as used in boats, cars and trucks.

The DC-input is protected with an internal fuse from overcurrent !

To prevent from high voltage spikes there are different voltage supressor diodes integrated. Short spikes up to 100V may be limited to 28V, to protect the internal electronic components.

4.4.2 Minimal DC-PowerInput voltage specification

If the car is starting the motor, the power supply voltage may be decreased for a short moment under 8Volt.

The MPC is running with a minimal voltage of 7.2Volt , measured at the input of the rear connector.

The following limits are specified:

DC-Input Voltage	Duration	Comment:
Over 30V	Protection circuit will work	
28V	Highest static input voltage	
12/24V	Allways: Nominal operating	
10Volt	Lowest static voltage	
8Volt	30sec limit	The current is to high !
7.2Volt	5sec limit	The high current brings the filters probably into saturation
6.5Volt	10ms limit	Determined by the input capacitor energy at a given load.

4.5 Power on modes (startup modes)

4.5.1 Automatically power on

Modes:

1. Default startup mode: start from the "⏻" button
2. Autostart: starts, when the main power is connected

Note:

Changing of the startup mode is possible only when the computer is powered (Standby mode), but the computer is not switched on.

In "off" state of the computer the led "PRG" is flashing about 2 times per second, in "on" state this led is off.

If the computer starts automatically (it's in mode 2), it's necessary to stop booting by pressing and holding the "⏻" button during 4 sec.

Change the startup mode:

To change the startup mode, it's necessary to push and hold the "SLEEP" button and press 1 (for mode 1) or 2 (for mode 2) times the button "⏻", then release the button "SLEEP".
If mode was changed the led "PRG" will indicate it with fast flashing.

4.5.2 Remote ON/OFF with IGNITION-Input

The computer may be started over an special control line, named as "IGNITION START". This features allows, to supply the computer always from the car supply, while the startup of the computer is done with the signal IGNITION from the car. The control logic is as follow:

In the state computer=OFF

Input IGNITION = 0V	no action
Input IGNITION = 12V	computer will be switched ON, the bootprocedure starts

In the state computer=ON

Input IGNITION = 0V	no action, computer stays in running mode
Input IGNITION = 12V	no action, computer stays in running mode

The logic levels of the IGNITION input is defined as follow:

Low level: < 2Volts
 High level: 8V to 28Volt
 Protection: optoisolated input with a load of 1k Ohms., reversepolarity protected

See also chapter [4.3.1](#) (Power Supply Connector)

4.6 *Harddisk 2.5" standard model*

The internal harddisk is mounted onto 4 shock absorbers.
Each absorber are gummi cylinders with 40 shores.

Technical Specifications of the internal harddisk without the shockabsorbers:

Characteristics:

Capacity	20 to 80 Gbyte
Manufacturer	IBM Travelstar Modell: IC25N020ATCS04 (20GB) IBM Travelstar Modell: IC25N040ATCS04 (40GB) IBM Travelstar Modell: IC25N060ATCS04 (60GB)
Sector size	512 Bytes
Data heads	16
Disks	2 or 4
Rotations speed	4200 RPM
Latency	7ms
Operating temperature	+5°C to +55°C
Relative Humidity	8% to 90%
Power-on hours	333h / month
Max. read/write duty cycles	20%
Vibration in operation	0.67G (5-500Hz) random
Non operation shock	800G / 1ms
Vibration non operat.	3G (5-500Hz)

4.7 *Harddisk 2.5" for extended temperature range*

This harddrive may be ordered separatly as an option.

The internal harddisk is mounted onto 4 shock absorbers.
Each absorber are gummi cylinders with 40 shores.

Technical Specifications of the internal harddisk without the shockabsorbers:

Characteristics:

Capacity	20 Gbyte
Manufacturer	IBM Travelstar Modell: A4K20-20 (20GB)
Sector size	512 Bytes
Data heads	16
Disks	2
Rotations speed	4200 RPM
Latency	7ms
Operating temperature	-20°C to +85°C (Gradient max. 60%/h)
Relative Humidity	5% to 90%
Power-on hours	333h / month
Max. read/write duty cycles	20%
Vibration in operation	1.0G (5-500Hz) random
Non operation shock	800G / 1ms
Vibration non operat.	5G (5-500Hz)

4.8 Serial- and Parallel Interfaces

4.8.1 Serial – Interface:

The serial channels are fully compatible with 16C550 UARTS. COM1 is the primary serial port, and is supported by the board's ROM-BIOS as the PC-DOS 'COM1' device. The secondary serial port is COM2; it is supported as the 'COM2' device.

Standard: COM 1/2: 16C550: 2 x 16C550 with 16 Byte FIFO

The serial ports are interfaced with a RS232C transmitter/receiver. As option the RS232C may be replaced with a RS422 or RS485 transmitter.

4.8.2 Parallelport - Interface:

A standard bi-directional LPT port is integrated into the MICROSPACE PC, with DMA7 support. Further information about these signals is available in numerous publications, including the IBM technical reference manuals for the PC and AT computers and from some other reference documents.

The current is: $I_{OH} = 12\text{mA}$ $I_{OL} = 24\text{mA}$

4.9 Controllers

4.9.1 INTEL Processor Pentium-M

The Intel® Pentium® M processor is a high performance, low power mobile processor with several micro-architectural enhancements over existing Intel mobile processors.

The following list provides some of the key features on this processor:

- Supports Intel® Architecture with Dynamic Execution
- High performance, low-power core
- On-die, primary 32-kbyte instruction cache and 32-kbyte write-back data cache
- On-die, 1-Mbyte / 2 Mbyte second level cache with Advanced Transfer Cache Architecture
- Advanced Branch Prediction and Data Prefetch Logic
- Streaming SIMD Extensions 2 (SSE2)
- 400/533-MHz, Source-Synchronous processor system bus
- Advanced Power Management features including Enhanced Intel® SpeedStep® technology
- Micro-FCPGA and Micro-FCBGA packaging technologies

The Intel Pentium M processor is manufactured on Intel's advanced 0.13/0.09 micron process technology with copper interconnect. The processor maintains support for MMX™ technology and Internet Streaming SIMD instructions and full compatibility with IA-32 software. The high performance core features architectural innovations like Micro-op Fusion and Advanced Stack Management that reduce the number of micro-ops handled by the processor. This results in more efficient scheduling and better performance at lower power. The on-die 32-kB Level 1 instruction and data caches and the 1-MB Level 2 cache with Advanced Transfer Cache Architecture enable significant performance improvement over existing mobile processors. The processor also features a very advanced branch prediction architecture that significantly reduces the number of mispredicted branches. The processor's Data Prefetch Logic speculatively fetches data to the L2 cache before an L1 cache requests occurs, resulting in reduced bus cycle penalties and improved performance. The Streaming SIMD Extensions 2 (SSE2) enable break-through levels of performance in multimedia applications including 3-D graphics, video decoding/encoding, and speech recognition. The new packed double-precision floating-point instructions enhance performance for applications that require greater range and precision, including scientific and engineering applications and advanced 3-D geometry techniques, such as ray tracing.

The Intel Pentium M processor's 400-MHz processor system bus utilizes a split-transaction, deferred reply protocol. The 400-MHz processor system bus uses Source-Synchronous Transfer (SST) of address and data to improve performance by transferring data four times per bus clock (4X data transfer rate, as in AGP 4X). Along with the 4X data bus, the address bus can deliver addresses two times per bus clock and is referred to as a "double-clocked" or 2X address bus. Working together, the 4X data bus and 2X address bus provide a data bus bandwidth of up to 3.2 Gbytes/second. The processor system bus uses Advanced Gunning Transceiver Logic (AGTL+) signal technology, a variant of GTL+ signalling technology with low power enhancements.

Note: The term AGTL+ has been used for Assisted Gunning Transceiver Logic technology on other Intel products.

4.9.1.1 Introduction

The processor features Enhanced Intel SpeedStep technology, which enables real-time dynamic switching between multiple voltage and frequency points instead of two points supported on previous versions of Intel SpeedStep technology. This results in optimal performance without compromising low power. The processor features the Auto Halt, Stop-Grant, Deep Sleep, and Deeper Sleep low power states. The Intel Pentium M processor utilizes socketable Micro Flip-Chip Pin Grid Array (Micro-FCPGA) and surface mount Micro Flip-Chip Ball Grid Array (Micro-FCBGA) package technology. The Micro-FCPGA package plugs into a 479-hole, surface-mount, Zero Insertion Force (ZIF) socket, which is referred to as the mPGA479M socket.

This document includes specifications for the Intel Pentium M processor at Highest Frequency Mode (HFM) core frequencies of 1.30, 1.40, 1.50, and 1.60 GHz, the Low Voltage Intel Pentium M processor at HFM core frequency of 1.10 GHz and the Ultra Low Voltage Intel Pentium M processor at HFM core frequency of 900 MHz.

4.9.1.2 Deep Sleep State

Deep Sleep state is a very low power state the processor can enter while maintaining context. Deep Sleep state is entered by asserting the DPSLP# pin while in the Sleep state. BCLK may be stopped during the Deep Sleep state for additional platform level power savings. BCLK stop/restart timings on Intel 855PM and Intel 855GM chipset-based platforms are as follows:

Intel® Pentium® M Processor Datasheet 14

4.9.1.2.1 Low Power Features

- Deep Sleep entry - DPSLP# and CPU_STP# are asserted simultaneously. The platform clock chip will stop/tristate BCLK within 2 BCLKs +/- a few nanoseconds.
- Deep Sleep exit - DPSLP# and CPU_STP# are deasserted simultaneously. The platform clock chip will drive BCLK to differential DC levels within 2-3 ns and starts toggling BCLK 2-6 BCLK periods later. To re-enter the Sleep state, the DPSLP# pin must be deasserted. BCLK can be re-started after DPSLP# deassertion as described above. A period of 30 microseconds (to allow for PLL stabilization) must occur before the processor can be considered to be in the Sleep state. Once in the Sleep state, the SLP# pin must be deasserted to re-enter the Stop-Grant state. While in Deep Sleep state, the processor is incapable of responding to snoop transactions or latching interrupt signals. No transitions of signals are allowed on the system bus while the processor is in Deep Sleep state. Any transition on an input signal before the processor has returned to Stop-Grant state will result in unpredictable behavior.

4.9.1.3 Deeper Sleep State

The Deeper Sleep state is the lowest power state the processor can enter. This state is functionally identical to the Deep Sleep state but at a lower core voltage. The control signals to the voltage regulator to initiate a transition to the Deeper Sleep state are provided on the platform. Please refer to the platform design guides for details.

4.9.1.4 Enhanced Intel® SpeedStep® Technology

The Intel Pentium M processor features Enhanced Intel SpeedStep® technology. Unlike previous implementations of Intel SpeedStep technology, this technology enables the processor to switch between multiple frequency and voltage points instead of two. This will enable superior performance with optimal power savings. Switching between states is software controlled unlike previous implementations where the GHI# pin is used to toggle between two states. Following are the key features of Enhanced Intel SpeedStep technology:

- Multiple voltage/frequency operating points provide optimal performance at the lowest power.
- Voltage/Frequency selection is software controlled by writing to processor MSR's (Model Specific Registers) thus eliminating chipset dependency.

— If the target frequency is higher than the current frequency, Vcc is ramped up by placing a new value on the VID pins and the PLL then locks to the new frequency.

— If the target frequency is lower than the current frequency, the PLL locks to the new frequency and the Vcc is changed through the VID pin mechanism.

— Software transitions are accepted at any time. If a previous transition is in progress, the new transition is deferred until its completion.

- The processor controls voltage ramp rates internally to ensure glitch free transitions.
- Low transition latency and large number of transitions possible per second.

— Processor core (including L2 cache) is unavailable for up to 10 µs during the frequency transition

— The bus protocol (BNR# mechanism) is used to block snooping

4.9.1.4.1 Low Power Features

- No bus master arbiter disable required prior to transition and no processor cache flush necessary.
- Improved Intel Thermal Monitor mode.
 - When the on-die thermal sensor indicates that the die temperature is too high, the processor can automatically perform a transition to a lower frequency/voltage specified in a software programmable MSR.
 - The processor waits for a fixed time period. If the die temperature is down to acceptable levels, an up transition to the previous frequency/voltage point occurs.
 - An interrupt is generated for the up and down Intel Thermal Monitor transitions enabling better system level thermal management.

Enhancements:

- Dynamic PSB Power Down
- BPRI# control for address and control input buffers
- Dynamic On Die Termination disabling
- Low VCCP (I/O termination voltage) switching power at all times.
monitoring requirements in the Deeper Sleep state.

4.10 INTEL 855GM: Grafic-Memory-Control Hub

4.10.1 Processor Host Interface

The GMCH is optimized for the Intel Pentium M processor. Key features of the Intel Pentium M processor system bus (PSB) are:

- Source synchronous double pumped address
- Source synchronous quad pumped data
- System bus interrupt delivery
- Low voltage swing ($V_{tt} = 1.05\text{ V}$)
- Dynamic Power Down (DPWR#) support
- GMCH supports a 64-B cache line size
- Support for a 400-MHz system bus frequency. Dual processor is not supported
- Integrates AGTL+ termination resistors on all of the AGTL+ signals
- Supports 64-bit host bus addressing allowing the CPU to access the entire 4 GB of the GMCH memory address space.
- A 12-deep, In-Order queue to support up to twelve outstanding pipelined address requests on the host bus
- Drives DPWR# signal to the processor, which can then disable its sense amplifiers
- Supports only one outstanding defer cycle at a time to any particular I/O interface
- Host initiated I/O cycles are positively decoded to the GMCH configuration space and subtractively decoded to the Hub Interface
- Host initiated memory cycles are positively decoded to DDR SDRAM
- Memory accesses initiated from the Hub Interface to DDR SDRAM will be snooped on the system bus

4.10.1.1 Intel 855GM GMCH Host Bus Error Checking

The Intel 855GM GMCH does not generate nor check parity on Data, Address/Request, and Response signals on the PSB.

4.10.1.2 Intel 855GM GMCH System Memory Interface

The GMCH System Memory Controller directly supports the following:

- One channel of PC1600/2100 SO-DIMM DDR SDRAM memory
- DDR SDRAM devices with densities of 128-Mb, 256-Mb, and 512-Mb technology
- Maximum System Memory with two, double-sided SO-DIMMs (four rows populated) supporting up to 1 -GB system memory, and high density supporting up to 2-GB system memory
- Variable page sizes of 2 kB, 4 kB, 8 kB, and 16 kB. Page size is individually selectable for every row and a maximum of 16 pages may be opened simultaneously

The GMCH System Memory interface supports a thermal throttling scheme to selectively throttle reads and/or writes. Throttling can be triggered either by the on-die thermal sensor, or by preset write bandwidth limits. Read throttle can also be triggered by an external input pin. The memory controller logic supports aggressive Dynamic Row Power Down features to help reduce power and supports Address and Control line Tri-stating when DDR SDRAM is in an active power down or in self refresh state. The GMCH System Memory architecture is optimized to maintain open pages (up to 16-kB page size) across multiple rows. As a result, up to 16 pages across four rows is supported. To complement this, the GMCH will tend to keep pages open within rows, or will only close a single bank on a page miss. The GMCH supports only four bank memory technologies.

4.10.2 Intel 855GM GMCH Internal Graphics

The GMCH IGD provides a highly integrated graphics accelerator delivering high performance 2D, 3D, and video capabilities. With its interfaces to UMA using a DVMT configuration, an analog display, a LVDS port, and two digital display ports (e.g. flat panel), the GMCH can provide a complete graphics solution.

The GMCH also provides 2D hardware acceleration for block transfers of data (BLTs). The BLT engine provides the ability to copy a source block of data to a destination and perform raster operations (e.g., ROP1, ROP2, and ROP3) on the data using a pattern, and/or another destination. Performing these common tasks in hardware reduces CPU load, and thus improves performance.

High bandwidth access to data is provided through the System Memory interface. The GMCH uses Tiling architecture to increase System Memory efficiency and thus maximize effective rendering bandwidth. The Intel 855GM GMCH also improves 3D performance and quality with 3D Zone Rendering technology.

The GMCH has four display ports, one analog and three digital. These provide support for a progressive scan analog monitor, a dedicated dual channel LVDS LCD panel, and two DVO devices. Each port can transmit data according to one or more protocols. The DVO ports are connected to an external device that converts one protocol to another. Examples of this are TV-out encoders, external DACs, LVDS transmitters, and TMDS transmitters. Each display port has control signals that may be used to control, configure and/or determine the capabilities of an external device. The data that is sent out the display port is selected from one of the two possible sources, Pipe A or Pipe B.

4.10.2.1 Intel 855GM GMCH Analog Display Port

Intel 855GM GMCH has an integrated 350-MHz, 24-bit RAMDAC that can directly drive a progressive scan analog monitor pixel resolution up to 1600x1200 at 85-Hz refresh and up to 2048x1536 at 72-Hz refresh. The Analog display port can be driven by Pipe A or Pipe B.

4.10.2.2 Intel 855GM GMCH Integrated DVO Ports

The DVO B/C interface is compliant with the DVI Specification 1.0. When combined with a DVI compliant external device (e.g. TMDS Flat Panel Transmitter, TV-out encoder, etc.), the GMCH provides a high-speed interface to a digital or analog display (e.g. flat panel, TV monitor, etc.). The GMCH provides two DVO ports that are each capable of driving a 165-MHz pixel clock at the DVO B or DVO C interface. When DVO B and DVO C are combined into a single DVO port, then an effective pixel rate of 330 MHz can be achieved. The DVO B/C ports can be driven by Pipe A or Pipe B. If driven on Pipe B, then the LVDS port must be disabled.

4.10.3 Hub Interface

A proprietary interconnect connects the GMCH to the ICH4-M. All communication between the GMCH and the ICH4-M occurs over the Hub Interface 1.5. The Hub Interface runs at 66 MHz (266-MB/s).

4.10.4 Address Decode Policies

Host initiated I/O cycles are positively decoded to the GMCH configuration space and subtractively decoded to Hub Interface. Host initiated System Memory cycles are positively decoded to DDR SDRAM and are again subtractively decoded to Hub Interface if under 4 GB. System Memory accesses from Hub Interface to DDR SDRAM will be snooped on the PSB.

4.11 IO Control Hub Intel-ICH4/ICH4M

Features:

PCI Bus Interface	Supports PCI Revision 2.2 Specification at 33 MHz
	133 MB/sec maximum throughput
	Supports up to six master devices on PCI
	One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)
	Support for 44-bit addressing on PCI using DAC protocol
Integrated LAN Controller	WfM 2.0 and IEEE 802.3 compliant
	LAN Connect Interface (LCI)
	10/100 Mbit/sec ethernet support
Integrated IDE Controller	Supports "Native Mode" register and interrupts
	Independent timing of up to 4 drives, with separate primary and secondary IDE cable connections
	Ultra ATA/100/66/33, BMIDE and PIO modes
	Tri-state modes to enable swap bay
USB	Includes three UHCI host controllers that support six external ports
	New: Includes one EHCI high-speed USB 2.0 Host Controller that supports all six ports
	New: Supports a USB 2.0 high-speed debug port
	Supports wake-up from sleeping states S1–S5
	Supports legacy keyboard/mouse software
AC-Link for Audio CODECs	Supports AC '97 2.3
	New: Third AC_SDATA_IN line for three codec support
	New: Independent bus master logic for seven channels (PCM In/Out, Mic 1 input, Mic 2 input, modem in/out, S/PDIF out)
	Separate independent PCI functions for audio and modem
	Support for up to six channels of PCM audio output (full AC3 decode)
	Supports wake-up events
Interrupt Controller	Support up to eight PCI interrupt pins
	Supports PCI 2.2 message signaled interrupts
	Two cascaded 82C59 with 15 interrupts
	Integrated I/O APIC capability with 24 interrupts
	Supports serial interrupt protocol
	Supports processor system bus interrupt delivery
New: 1.5 V operation with 3.3 V I/O	5 V tolerant buffers on IDE, PCI, USB overcurrent and legacy signals
Timers Based on 82C54	System timer, refresh request, speaker tone output

Power Management Logic	ACPI 2.0 compliant
	ACPI-defined power states (C1–C2, S3–S5)
	Supports Desktop S1 state (like C2 state, only STPCLK# active)
	ACPI power management timer
	PCI PME# support
	SMI# generation
	All registers readable/restorable for proper resume from 0V susp.states
External Glue Integration	Integrated pull-up, pull-down and series termination resistors on IDE, processor interface
	Integrated Pull-down and Series resistors on USB
Enhanced Hub Interface Buffers Improve Routing flexibility (Not available with all MemController Hubs)	
Firmware Hub (FWH) Interface Supports BIOS memory size up to 8 MB	
Low Pin Count (LPC) Interface	Supports two Master/DMA devices.
Enhanced DMA Controller	Two cascaded 8237 DMA controllers
	PCI DMA: Supports PC/PCI — Includes two PC/PCI REQ#/GNT# pairs
	Supports LPC DMA
	Supports DMA collection buffer to provide Type-F DMA performance for all DMA channels
Real-Time Clock	256-byte battery-backed CMOS RAM
System TCO Reduction Circuits	Timers to generate SMI# and Reset upon detection of system hang
	Timers to detect improper processor reset
	Supports ability to disable external devices
SMBus	New: Hardware packet error checking
	New: Supports SMBus 2.0 Specification
	Host interface allows processor to communicate via SMBus
	Slave interface allows an ext. microcontroller to access system resources
	Compatible with most 2-wire components that are also I2C compatible
GPIO	TTL, open-drain, inversion

4.11.1 Addressing PCI Devices on the MSM855:

DEVICE	IDSEL	PIRQ	#REG	#GNT	Remarks
internal Chipset PCI devices and resources					
GMCH	internal	A / B / C / D	---	---	PCI Bus 0
AGP Controller	internal	A / B	---	---	PCI Bus 0
Graphics Controller	internal	A / B	---	---	PCI Bus 0
ICH4_USB Controller	Internal	A / D / C / H	---	---	PCI Bus 0 Func 0 = USB0 mapped to PIRQA Func 1 = USB1 mapped to PIRQD Func 2 = USB2 mapped to PIRQC Func 7 = USB3 mapped to PIRQH
ICH4_PCI Controller	internal	A / B / C / D	---	---	PCI Bus 0
ICH4_LPC Controller		C / B	---	---	PCI Bus 0 IDE mapped to PIRQC SMB mapped to PIRQB AC97 Audio mapped to PIRQB AC97 Modem mapped to PIRQB
Network	AD24	E	---	---	Internal chipset onboard device
external PCI slots					
PC/104+ Slot 1	AD20	E / F / G / H	0-4	0-4	PCI Bus 2
PC/104+ Slot 2	AD21	F / G / H / E	0-4	0-4	PCI Bus 2
PC/104+ Slot 3	AD22	G / H / E / F	0-4	0-4	PCI Bus 2
PC/104+ Slot 4	AD23	H / E / F / G	0-4	0-4	PCI Bus 2

Separate PCI Controller onboard.

DEVICE	IDSEL	PIRQ	#REG	#GNT	Remarks
Firewire	AD29				onboard
MiniPCI	AD27				onboard
LAN2	AD26				onboard
LAN3	AD25				onboard

4.11.2 Interrupt Controllers

An 8259A compatible interrupt controller, within the chipset device, provides seven prioritized interrupt levels. Of these, several are normally associated with the board's onboard device interfaces and controllers, and several are available on the AT expansion bus.

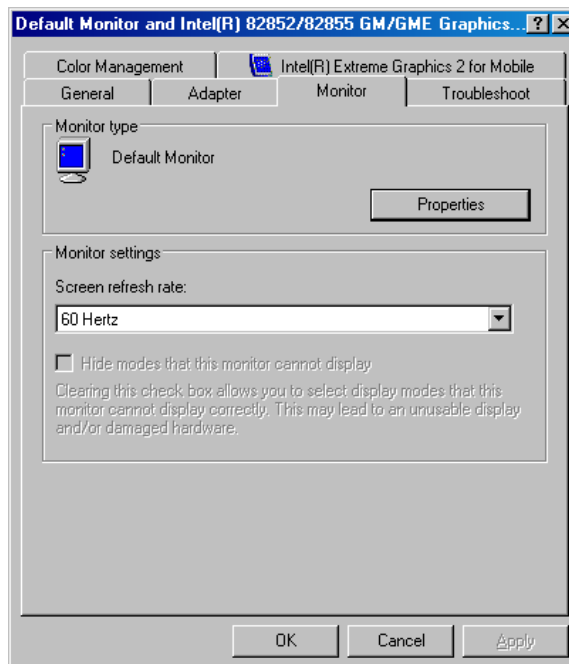
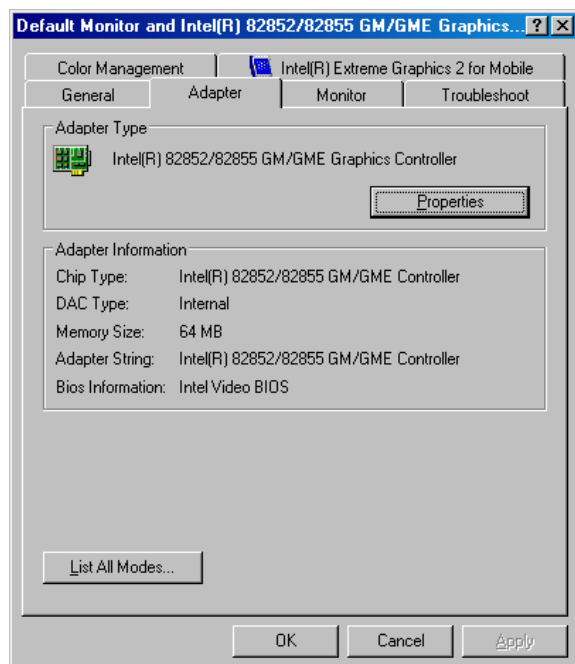
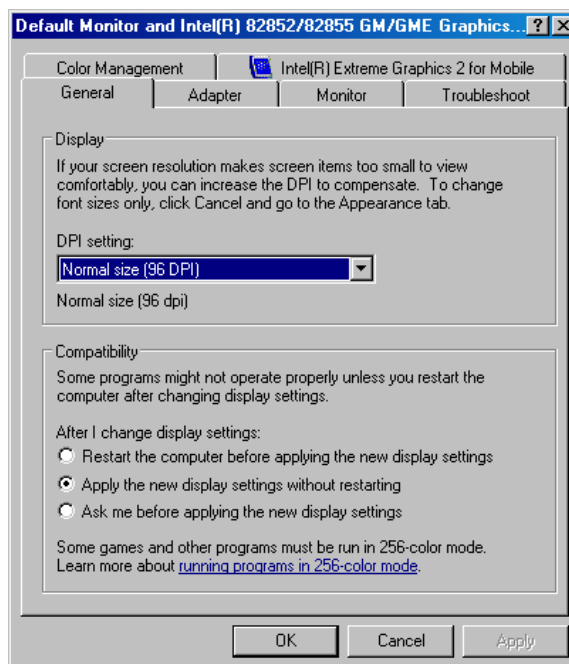
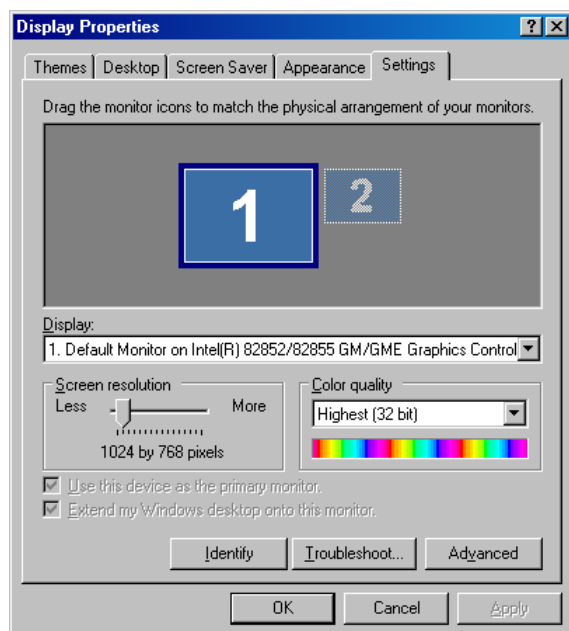
Interrupt	Sources	onboard used
IRQ0	ROM-BIOS clock tick function, from timer 0	yes
IRQ1	Keyboard controller output buffer full	yes
IRQ2	Used for cascade 2. 8259	yes
IRQ3	COM2 (fix)	yes
IRQ4	COM1 (fix)	yes
IRQ5	Reserved	yes
IRQ6	Not used (if disabled Floppy function)	yes
IRQ7	Reserved for LPT1	yes
IRQ8	System CMOS / real time clock	yes
IRQ9	ACPI-Compliant system PCI-9 for USB PCI-9 for LAN PCI-9 for Sound PCI-9 for Firewire	yes
IRQ10	Reserved for PCMCIA Controller socket 1	No
IRQ11	Reserved for PCMCIA Controller socket 2	No
IRQ12	PS/2 mouse	Yes
IRQ13	Math coprocessor	Yes
IRQ14	Harddisk Primary - IDE	Yes
IRQ15	CD/DVD-Drive DIE	yes

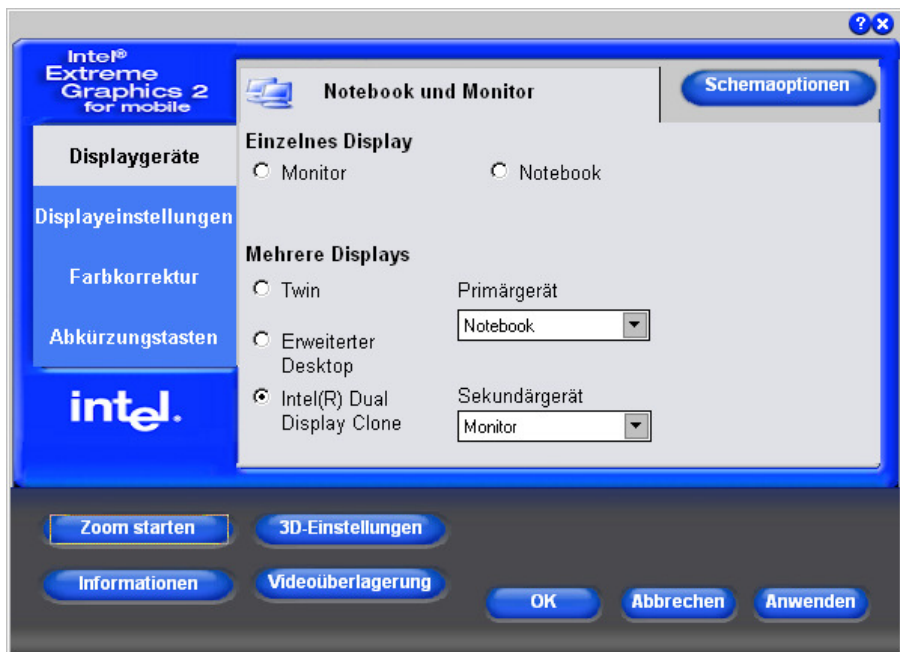
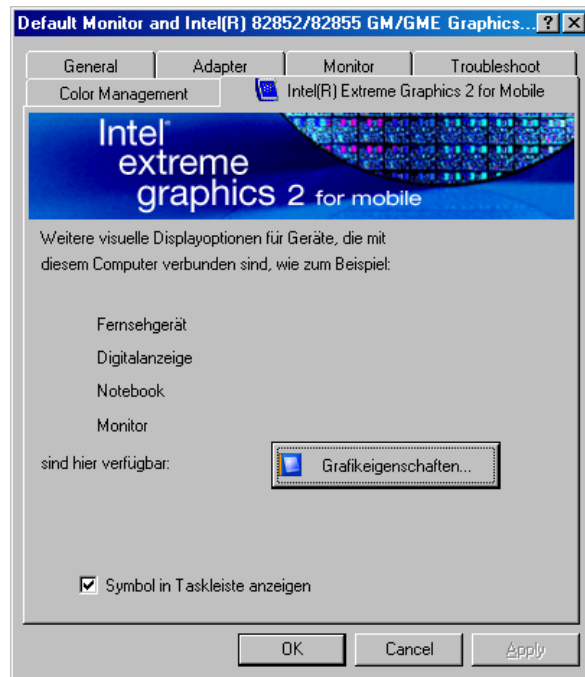
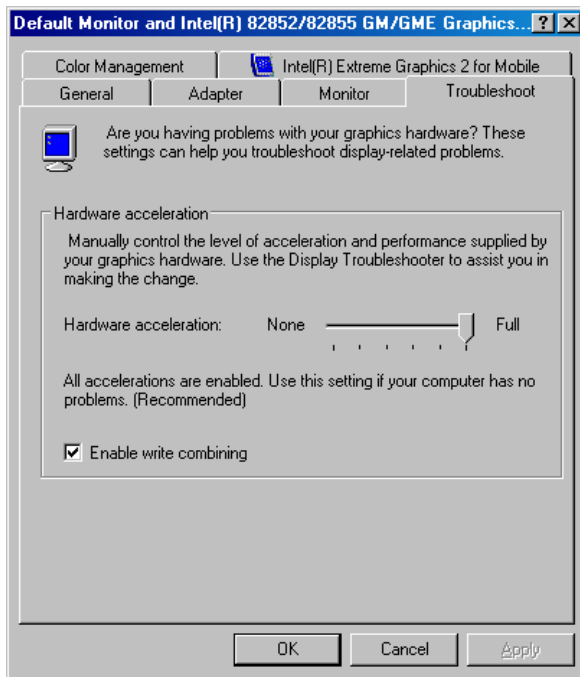
Attention:

LPT1: Printerfunction without IRQ-support, if needed use an USB-Printer
 FD: No floppy support, use always a USB-Floppy

4.12 VGA, LCD

Start / Control Panel / Appearance and Themes / Display
Register Settings:





Attention!

There is no picture after changing values in the menu "DISPLAY PROPERTIES -> Settings" or you started the system without a connected monitor:

You have to press the following key combination to get a picture again:

CTRL+ALT+ **Fx**

Fx:

F1 = VGA

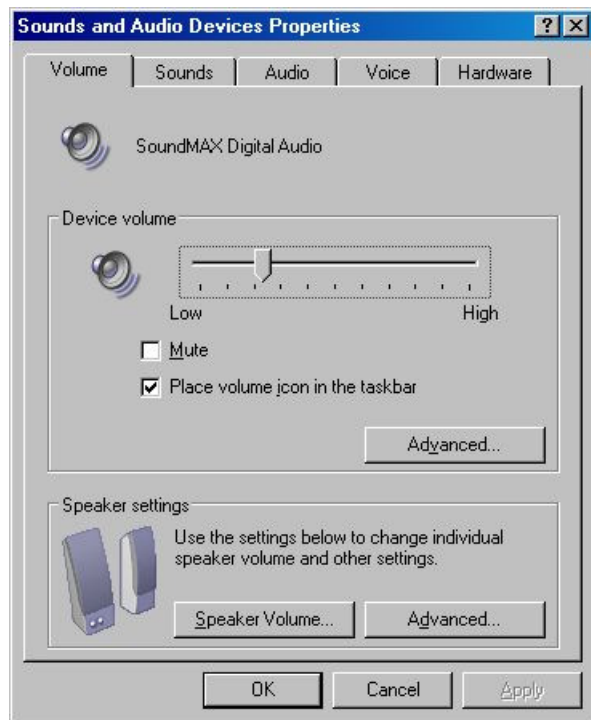
F2 or F3 = SVIDEO

F4 = DVI

We recommend to change the settings in this Intel graphic menu.

4.13 AC97 Sound

Sound Settings:



4.14 Speedstep Performance Control

The Pentium-M improved the Speedstep mechanism, in adding a third power scheme in addition to the low-power and the full-performance modes. This new mode is called **adaptive** mode, and allows the frequency and voltage to switch according to the CPU activity. The CPU uses a low-power mode by default, but when its activity increases, it switches itself very quickly in full-performance mode. This new power scheme is very pleasant to use, because it allows to get the full CPU speed only when it is needed. Of course, the power consumption depends on the CPU activity, and the more the CPU is used, the more it consumes power.

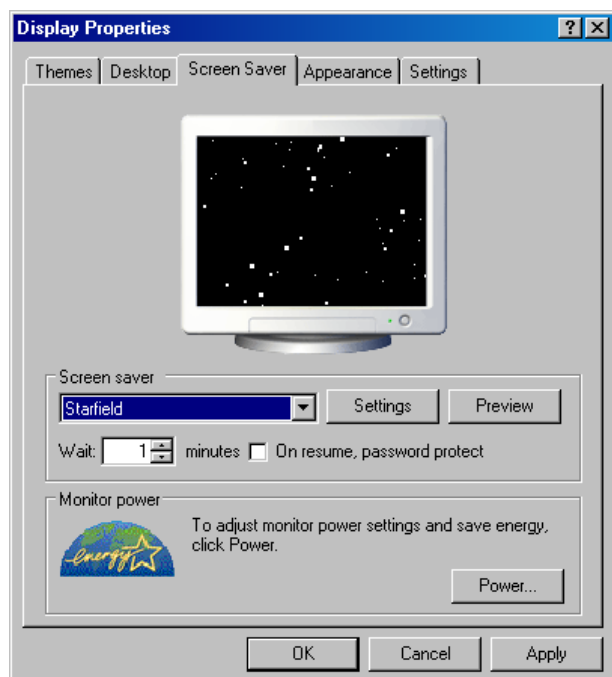
Windows XP Power Schemes	AC Power (Frequency Example mobile Pentium-M 1.6 GHz)
Home/Office Desktop	None (1.6 GHz Always)
Portable /Laptop	Adaptive (600 MHz <...>1.6 GHz)
Presentation	Adaptive (600 MHz <...>1.6 GHz)
Always On	None (1.6 GHz Always)
Minimal Power Management	Adaptive (600 MHz <...>1.6 GHz)
Maximum Battery	Adaptive (600 MHz <...>1.6 GHz)

CPU performance is heavily dependent on the choice of power scheme in the system control

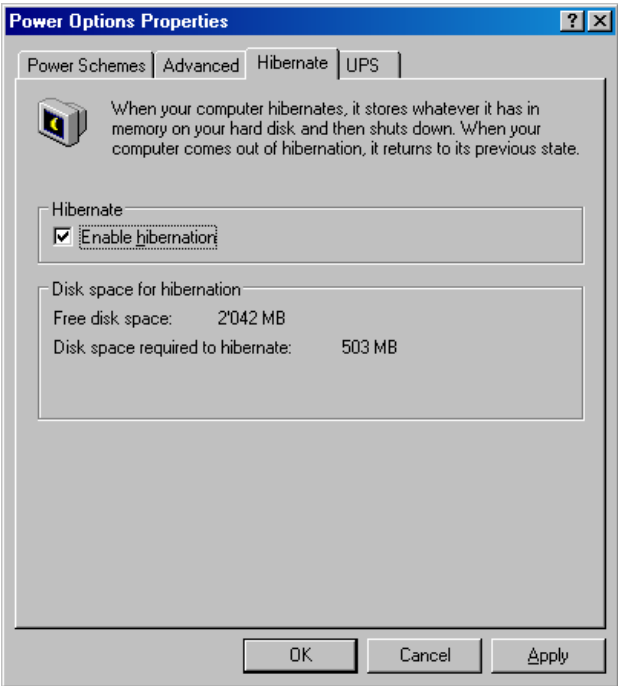
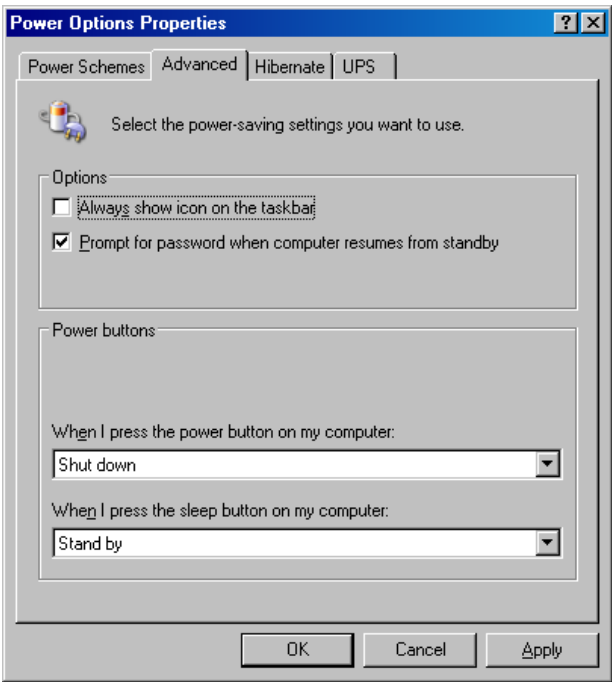
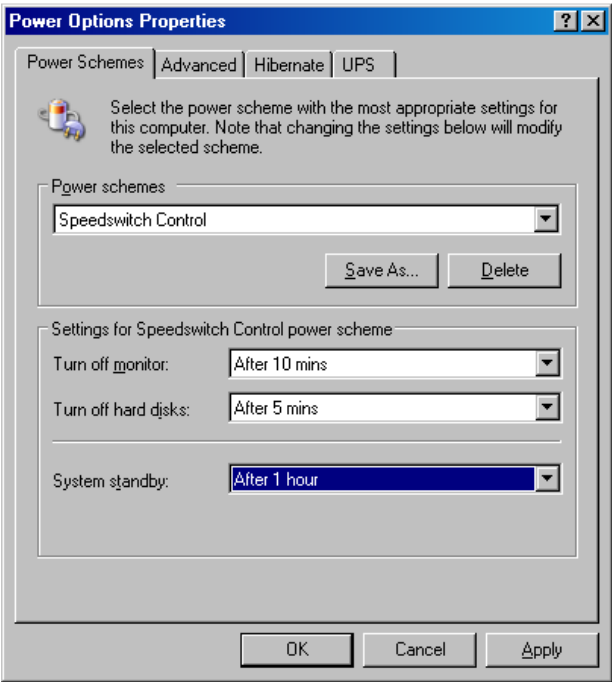
4.14.1 Set up Powermanagement

Start / Control Panel / Appearance and Themes / Display

Go to the register Screen Saver



Press Power Button



4.15 FIREWIRE IEEE1394

Description:

The Texas Instruments TSB43AB22 device is an integrated 1394a-2000 OHCI PHY/link-layer controller (LLC) device that is fully compliant with the *PCI Local Bus Specification*, the *PCI Bus Power Management Interface Specification*,

IEEE Std 1394-1995, IEEE Std 1394a-2000, and the *1394 Open Host Controller Interface Specification*. It is capable of transferring data between the 33-MHz PCI bus and the 1394 bus at 100M bits/s, 200M bits/s, and 400M bits/s. The TSB43AB22 device provides two 1394 ports that have separate cable bias (TPBIAS). The TSB43AB22 device also supports the IEEE Std 1394a-2000 power-down features for battery-operated applications and arbitration enhancements.

Features:

The TSB43AB22 device supports the following features:

- Fully compliant with provisions of IEEE Std 1394-1995 for a high-performance and IEEE Std 1394a
- Fully interoperable with FireWire and i.LINK implementations of IEEE Std 1394
- Compliant with Intel *Mobile Power Guideline 2000*
- Full IEEE Std 1394a-2000 support includes: connection debounce, arbitrated short reset, multispeed concatenation, arbitration acceleration, fly-by concatenation, and port disable/suspend/resume
- Two IEEE Std 1394a-2000 fully compliant cable ports at 100M bits/s, 200M bits/s, and 400M bits/s
- Cable ports monitor line conditions for active connection to remote node
- Cable power presence monitoring
- PCI burst transfers and deep FIFOs to tolerate large host latency
- External cycle timer control for customized synchronization
- Extended resume signaling for compatibility with legacy DV components
- PHY-Link logic performs system initialization and arbitration functions
- PHY-Link encode and decode functions included for data-strobe bit level encoding
- PHY-Link incoming data resynchronized to local clock
- Low-cost 24.576-MHz crystal provides transmit and receive data at 100M bits/s, 200 and 400M bits/s
- Node power class information signaling for system power management
- Serial ROM interface supports 2-wire serial EEPROM devices
- Register bits give software control of contender, power class, link active control bit, and IEEE Std 1394a
- PCI and CardBus register support
- Isochronous receive dual-buffer mode
- Out-of-order pipelining for asynchronous transmit requests
- Register access fail interrupt when the PHY SCLK is not active
- PCI power-management D0, D1, D2, and D3 power states
- Initial bandwidth available and initial channels available registers

Related Documents:

- *1394 Open Host Controller Interface Specification* (Release 1.1)
- *IEEE Standard for a High Performance Serial Bus* (IEEE Std 1394-1995)
- *IEEE Standard for a High Performance Serial Bus—Amendment 1* (IEEE Std 1394a-2000)
- *PC Card Standard—Electrical Specification*
- *PC 2001 Design Guide*
- *PCI Bus Power Management Interface Specification* (Revision 1.1)
- *PCI Local Bus Specification* (Revision 2.2)
- *Mobile Power Guideline 2000*
- *Serial Bus Protocol 2* (SBP-2)
- *IEC 61883-1:1998 Consumer Audio/Video Equipment Digital Interface Part 1: General*

4.16 USB V2.0

USB Host controller functional description:

PIIX4 contains a USB Host Controller (HC). The Host Controller includes the root hub with two USB ports. This permits connection of two USB peripheral devices directly to PIIX4 without an external hub. If more devices are required, an external hub can be connected to either of the built-in ports. The USB's PCI configuration registers are located in function 2, PCI configuration space. The PIIX4 Host Controller completely supports the standard Universal Host Controller Interface (UHCI) and thus, takes advantage of the standard software drivers written to be compatible with UHCI. Figure 9 shows a conceptual view of a USB system. UHCI consists of two parts—Host Controller Driver (HCD) and Host Controller (HC). The Host Controller interfaces to the USB system software in the host via the HCD. The HCD software manages the Host Controller operation and is responsible for scheduling the traffic on USB by posting and maintaining transactions in system memory. HCD is part of the system software and is typically provided by the operating system vendor. HCD provides the software layer between the PIIX4's Host Controller and the USB software layer (also located in the operating system). The UHCI's HCD software interprets requests from the USB and builds Frame List, Transfer Descriptor, Queue Head, and data buffer data structures for the Host Controller. The data structures are built in system memory and contain all necessary information to provide end-to-end communication between client software in the host and devices on the USB. The PIIX4's Host Controller moves data between system memory and devices on the USB by processing these data structures and generating the transaction on USB. The Host Controller executes the schedule lists generated by HCD and reports the status of transactions on the USB to HCD. Command execution includes generating serial bus token and data packets based on the command and initiating transmission on USB. For commands that require the Host Controller to receive data from the USB device, the Host Controller receives the data and then transfers it to the system memory pointed to by the command. The UHCI's HCD provides sufficient commands and data to keep ahead of the Host Controller execution and analyzes the results as the commands are completed.

For additional information on the functionality of PIIX4 USB Host Controller, refer to the Universal Host Controller Interface (UHCI) Design Guide, Revision 1.1 available from Intel Literature Center with order number 297650- 002. Note that the UHCI Design Guide refers to USB ports 1 and 2. The PIIX4 USB ports are ports 0 and 1 respectively. Additions to the PIIX4 USB interface beyond UHCI, revision 1.1 include support for over-current detection on USB ports 0 and 1. If an over-current condition is detected on a USB port, that port will be disabled. Bits 10:11 in each Port Status and Control register are used to report over-current conditions.

4.17 PCMCIA / PC-Card (only MPC40B)

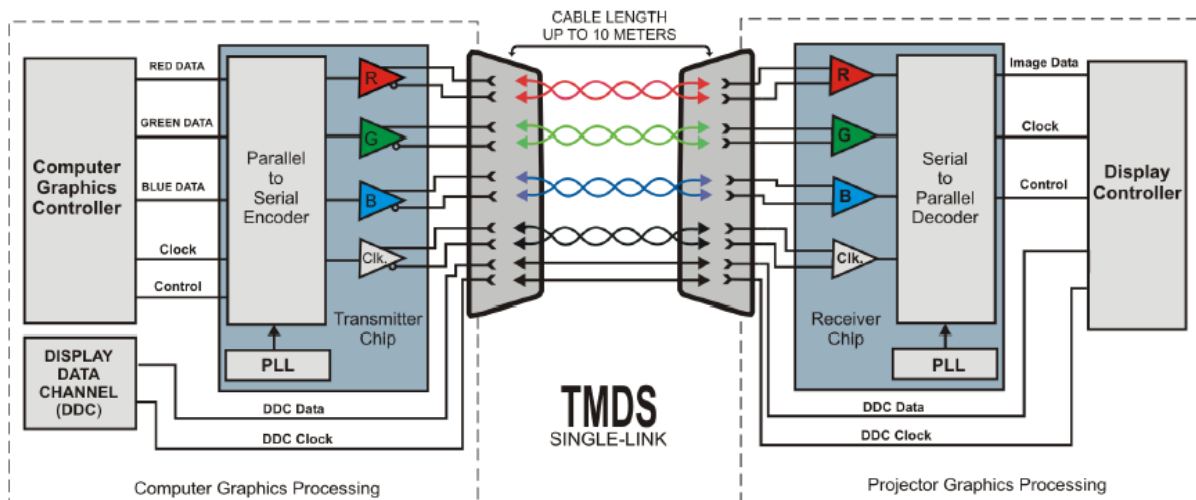
Remark:

You can use only one 32Bit PCMCIA card in the MPC40B system.

That means, only one slot of the MPC40B supports 32Bit CardBUS. The second slot can be used with a 16Bit PCMCIA card

4.18 LCD Panellink (DVI)

Silicon Image's Transition Minimized Differential Signaling is an electrical standard used to transmit digital data to a display device. The transition minimization is achieved by implementing an advanced encoding algorithm that converts 8 bits of data into a 10-bit transition minimized, DC balanced character. The signal is optimized to reduce Electromagnetic Interference (EMI), which allows for faster signal transfer rates with increased accuracy. The differential circuitry in TMDS allows complimentary limited amplitude signals to be transmitted over twisted pair wires instead of more expensive coaxial cable. The TMDS link architecture consists of a TMDS transmitter that encodes and serially transmits a data stream over the TMDS link to a TMDS receiver. Video and sync information are serialized and sent over three sets of twisted pair wires, one set for red, green and blue data channels. An additional pair of wires is used to transmit a clock signal for timing. At the other end, the TMDS receiver synchronizes itself to character boundaries in each of the serial data streams, the transmitted signal is recovered and decoded. A fundamental principle of physics known as the "Copper Barrier" limits the amount of data that can be squeezed through a single copper wire. The limit is a bandwidth of about 165MHz, which equates to 165 million pixels per second. A single TMDS link has a bandwidth of 165 MHz, which enough to display resolutions of up to 1600 x 1200 (UXGA) at 60Hz. DVI, which is the first standard specifically written for the TMDS digital interface allows for up to two TMDS links, a total of 6 channels sharing a single clock, to be integrated into a single DVI connector to support a minimum bandwidth of 330 mega pixels per second. That is enough bandwidth to enable digital displays to reach resolutions of up to 2048 x 1536 (QXGA).



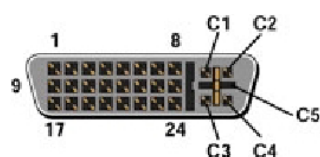
The DVI specification supports hot plug and play of display devices. DVI also supports the VESA Display Data Channel (DDC) and Extended Display Identification Data (EDID) specifications, which enable the display, graphics adapter, and computer to communicate and automatically configure the system to support the different features available in the display. EDID is a standard data format for information such as display vendor, resolution and timing capabilities. A purely digital connection allows projector manufacturers to design products, which provide the sharpest, clearest image possible, without the need for any fine sync or complex pixel clock adjustments.

DISPLAY RESOLUTION CHART	
Resolution Name	Pixel Resolution
Video Graphics Array (VGA)	640 x 480
Super VGA (SVGA)	800 x 600
Extended Graphics Array (XGA)	1024 x 768
Super XGA	1280 x 1024
Ultra XGA	1600 x 1200
High Definition TV (HDTV)	1920 x 1080
Quad XGA (QXGA)	2048 x 1536

Display	RESOLUTIONS SUPPORTED BY DVI	
	Single-Link DVI	Dual-Link DVI
60-Hz LCD with 5% blanking interval	Up to 1920 x 1080 (HDTV)	Up to 2048 x 1536 (QXGA)
75-Hz CRT with approx. 15% blanking interval	Up to 1280 x 1024 (SXGA)	Up to QXGA
85-Hz CRT with approx. 15% blanking interval	Up to SXGA	Up to HDTV

4.18.1 DVI-Integrated (DVI-I):

Supports both analog and digital connections to the display. This 29-pin connector can carry single or dual-link all-digital video/data signals on 24 pins and uses 5 pins to carry analog video/data signals and ground. It is easily distinguishable by the plus-shaped slot surrounded by four pins used to carry the analog connection.



DVI-I
Receptacle Connector

COMBINED ANALOG AND DIGITAL CONNECTOR PIN ASSIGNMENTS					
Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2/4 Shield	11	T.M.D.S. Data1/3 Shield	19	T.M.D.S. Data0/5 Shield
4	T.M.D.S. Data4-	12	T.M.D.S. Data3-	20	T.M.D.S. Data5-
5	T.M.D.S. Data4+	13	T.M.D.S. Data3+	21	T.M.D.S. Data5+
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	Ground (return for +5V, Hsync, and Vsync)	23	T.M.D.S. Clock+
8	Analog Vertical Sync	16	Hot Plug Detect	24	T.M.D.S. Clock-
C1	Analog Red	C2	Analog Green	C3	Analog Blue
C4	Analog Horizontal Sync	C5	Analog Ground (analog R,G, &B return)		

4.18.2 General Description:

The Sil 160 transmitter uses PanelLink Digital technology to support displays ranging from VGA to UXGA resolutions (25-165 MHz). The Sil 160 transmitter supports up to true color panels (24 bit/pixel, 16.7M colors) in 1 or 2 pixels/clock mode, and also features an inter-pair skew tolerance up to 1 full input clock cycle. An advanced on-chip jitter filter is also added to extend tolerance to VGA clock jitter. Since all PanelLink products are designed on scaleable CMOS architecture to support future performance requirements while maintaining the same logical interface, system designers can be assured that the interface will be fixed through a number of technology and performance generations. PanelLink Digital technology simplifies PC & display interface design by resolving many of the system level issues associated with high-speed digital design, providing the system designer with a digital interface solution that is quicker to market and lower in cost.

Features:

- Scaleable Bandwidth: 25-165 MHz (VGA to UXGA)
- Low Power: 3.3V core operation
- High Skew Tolerance: 1 full input clock cycle (6ns at 165 MHz)
- Flexible panel interface: single or dual pixel in at up to 24-bits
- Cable Distance Support: over 5m with twisted-pair, fiber-optics ready
- Compliant with DVI 1.0 (DVI is backwards compatible with VESA® P&DTM and DFP)

Transmitter from Silicon Image: SIL 160

Recommended receiver: SIL161

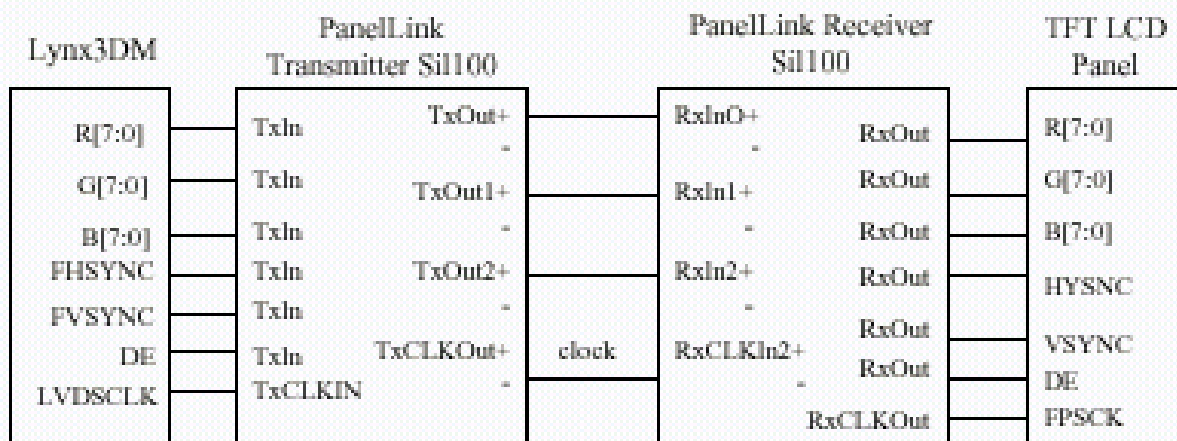


Figure 25: PanelLink Interface with TFT LCD Panel

4.19 IrDA- Option

Since BIOS version V1.02, standard- IrDA can be accessed through the connector X7 (pin5/pin6). The IrDA-Interface is not assembled on the Standard-Product. It is available as option.

4.19.1 IrDA-BIOS Settings

I/O Device Configuration :

Serial Port B :	Auto oder Enabled
Mode :	IRDA
Base I/O Address :	2F8
Interrupt :	IRQ 3

4.20 WLAN Option

Internally connected to the UBS channel 1 !

General Feature

Compliance with IEEE802.11b

Compliance with USB v1.1

Compliance with WECA Wi-Fi

Security

I Support IEEE 802.11 compatible 64 bit WEP

I Support 128 bits 128RC4 algorithm

Hardware Specification

Radio

Chip set: *Intersil Prism2.5*

Base-band processor/MAC chip: *ISL3873B*

Data rate: *1,2,5.5,11 Mbps*

Nominal radiated power: *14dBm (For ETSI/FCC/ARIB)*

Receiver sensitivity with data rate $FER = 8 \cdot 10^{-2}$

11Mbps < -82dBm

5.5Mbps < -84dBm

2Mbps < -88dBm

1Mbps < -90dBm

Security system: *RC4 WEP 64 /128bit*

Operating mode: *Ad-hoc, 802.11 Ad-hoc and Infrastructure*

Adaptor firmware

Protocol and device driver interface identical to Intersil firmware

According to IEEE802.11b regulation, all channels (channel 1 ~ channel 14) should be allowed (2.400GHz~2.497GHz)

USA/Canada *Ch1-Ch11* , Europe/Mainland China *Ch1-Ch13*, Japan *Ch1-Ch14*

Card standard

Standard: IEEE 802.11(b) Compliant

Regulation

US: *FCC PART 15 SUBPART B&C(3M)*

Canada: *RSS 210*

Europe : *EN60950(LVD), EN 300 328(EMI), ETS 301 489(EMS)*

5 OPERATING SYSTEMS COMPATIBILITY

The CPU PENTIUM is fully compatible to other PC-standard CPUs. The Intel chipsets are also fully PC-compatible. No incompatibilities are known.

5.1 *Microsoft Windows*

This system is fully compatible with Windows 2000 and Windows XP Professional / Home and XPe.

We do not recommend to install older Windows OS as Windows 95/98/ME/NT4 because of the incomplete driver support from Intel.

5.2 *Microsoft Windows CE 4.2 / 5.0 /6.0*

Since we are in cooperation with Pfaadtsoft we recommend to use the WINCE 4.2/5.0 Board Support Package (BSP) which are developed especially for this product.

<http://www.pfaadtsoft.de/>

There are also DEMO Windows CE 4.2 / 5.0 images available for free:

<http://dlag.pfaadtsoft.de/>

5.3 *LINUX*

Since we are in cooperation with SYSCO we recommend to use the ElinOS Linux distribution.

<http://www.elinos.com/>

SYSCO developed a board support package (BSP) for the Pentium M and the Pentium BX/TX chipset based products for ELinOS.

If you are interested or if you have any questions about ElinOS, please get in contact with SYSCO.

5.3.1 What is ELinOS?

ELinOS is a development environment based on Linux for the creation of embedded systems for intelligent devices. With ELinOS the memory demand of Linux is reduced to less than 1 MB ROM and 2 MB RAM. In this manner, Linux can for the first time conform to the reduced hardware conditions of embedded systems. Even in this basic configuration, Linux offers largely the same functionality which made it so popular in the server and desktop field. By virtue of access to the constantly growing number of Linux components, the basic system can be at any time expanded.

The core of ELinOS is a Linux distribution custom-tailored to the embedded systems currently sold. Besides the well-known Linux version for x86, ELinOS v2.2 also supports PowerPC-, ARM-, MIPS-, and SH3-platforms which are very popular in the embedded field.

5.3.2 ELinOS

The emphasis of ELinOS is on the new CoTools, CODEO and COGNITO. CODEO is Eclipse based and provides additional Plug-ins for project management and target communication, which substantially improves the ease of development of applications with ELinOS. COGNITO is a further integrated tool for the analysis of system performance. It permits the collection, recording and display of all system information and facilitates the fast optimization of software for intelligent devices.

ELinOS has been updated to the new version of the GNU tool chain, contains the stable 2.4.25 Linux Kernel and has integration of Java and the real time extensions RTAI 3.0 for hard real time requirements. The package is complemented with Carrier Grade Extensions such as IPv6, IPSec, SNMP etc. for the use of Linux in applications in the telecommunications market.

5.4 Realtime OS

Must be tested carefully first. Many powermanagementfunction will control the latency time.
Contact your realtime operating system manufacturer and ask for the support of the intel chipset 855GME.

6 DRIVER INSTALLATION

6.1 Windows 2000 & XP

On the MICROSPACE Application CD you will find all tools and drivers you will need to work with the card. If you are not sure about the topicality of the software, please visit our homepage at <http://www.digitallogic.com> to get the latest releases !

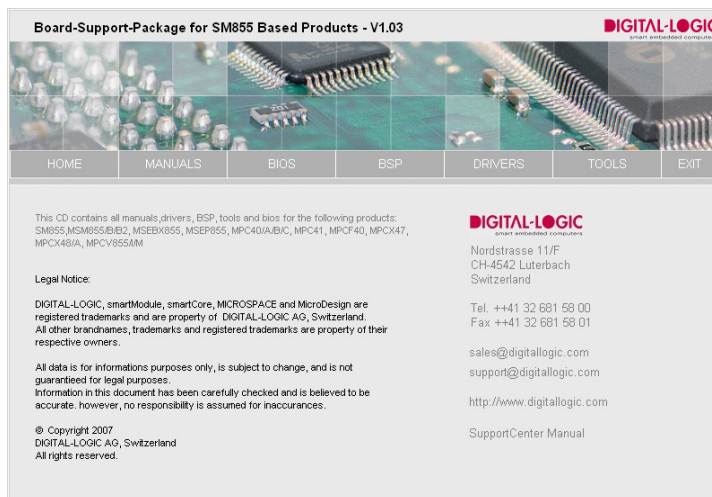
A correct installation of Windows is required for the following steps.

Close all applications before beginning with driver installation!

Put DIGITAL-LOGIC driver CD into CD-drive. Start menu is supposed to appear automatically.

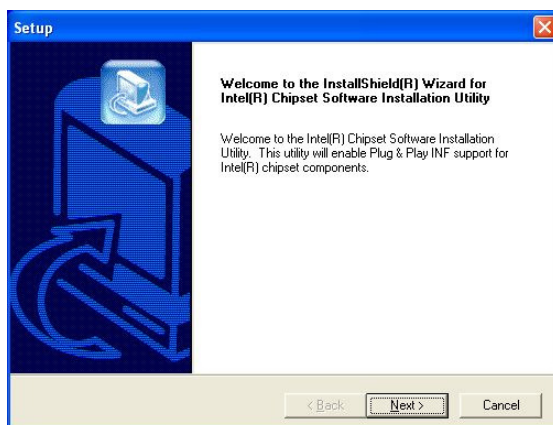
Select: Products / MSM / PC104 cpu boards Intel855 / Drivers XP W2k. If there is no menu then open up CD manually on desktop.

6.1.1 Chipset:



Driver: BSP CD 855: \DRIVERS\XP-W2k\Chipset\General-Chipset-Driver

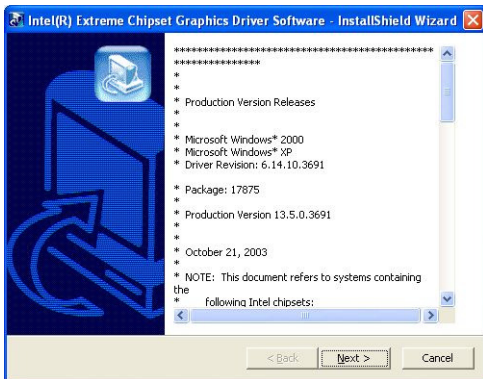
Doubleclick on setup.exe. Follow the instructions:



Reboot the system after the installation.

6.1.2 VGA / CRT

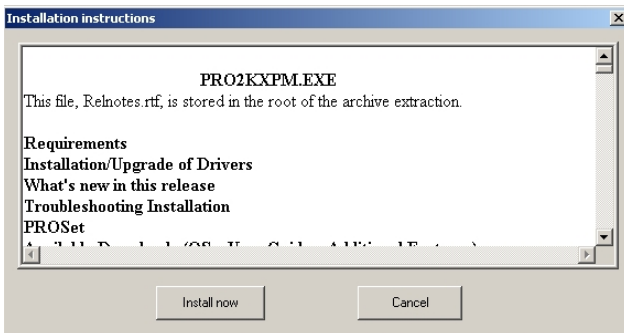
Driver: BSP CD 855: \DRIVERS\XP-W2k\VGA\General-VGA-Driver
Doubleclick on setup.exe. Follow the instructions:



Reboot the system after the installation.

6.1.3 LAN / Ethernet

Driver: BSP CD 855: \DRIVERS\XP-W2k\LAN\General-LAN-Driver
Doubleclick on setup.exe. Follow the instructions:



or doubleclick autorun.exe and follow thw instructions:

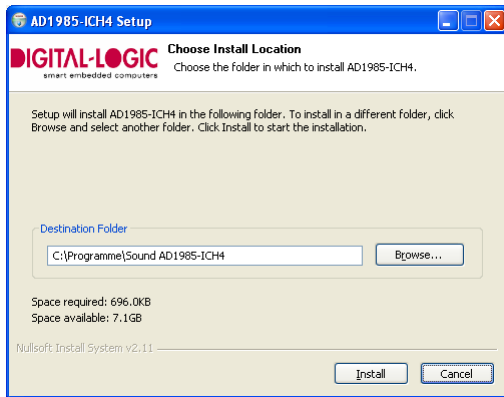


Press "Install Software"

Reboot the system after the installation.

6.1.4 AC97-SOUND

Driver: BSP CD 855: \DRIVERS\XP-W2k\Audio\General-Audio-Driver
Doubleclick on setup.exe Follow the instructions:

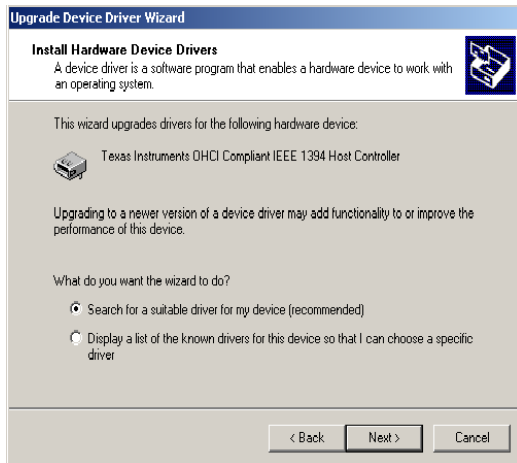


Reboot the system after the installation.

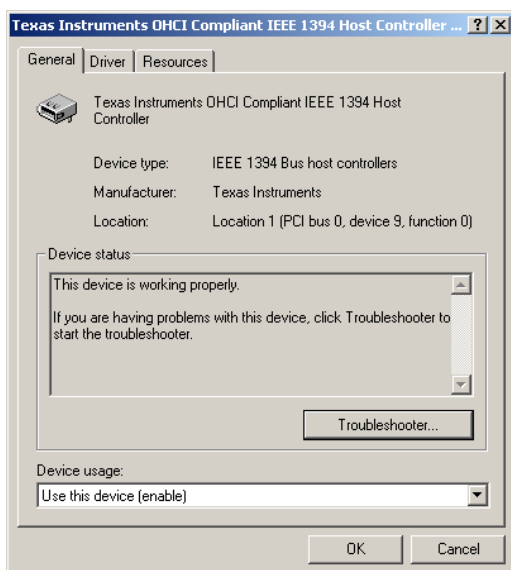
6.1.5 IEEE1394 / FireWire

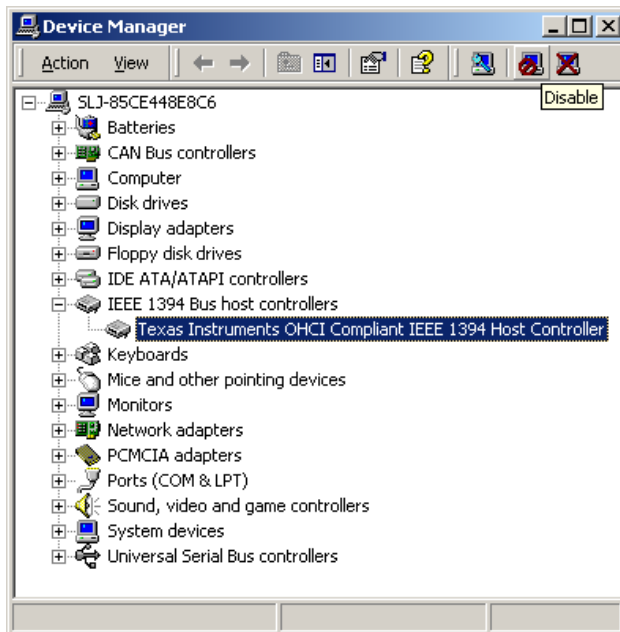
The TSB43AB22 drivers are directly available under windows (Texas Instrument OHCI compatible IEE1394 Host Controller)

Required driver for the TSB43AB22 under Windows 2000



Installed driver under Windows 2000



Driver location under Hardware manager**6.1.5.1 EEPROM Update utility**

An EEPROM is present on the design storing some important information about PCI configuration and a global unique ID that is required by all 1394 device to be fully compliant.

The MSMW104+ EEPROM is already programmed with the right file to configure PCI registers specific to TI TSB43AB22 device. Customer could need to reprogram the EEPROM, either because it has been damaged or to provide a new ID.

The program OHCIROM.EXE with its different options enables a selective update of the EEPROM content. Please consult chapter 3 to find the location of the tool on the Digital-Logic product CD.

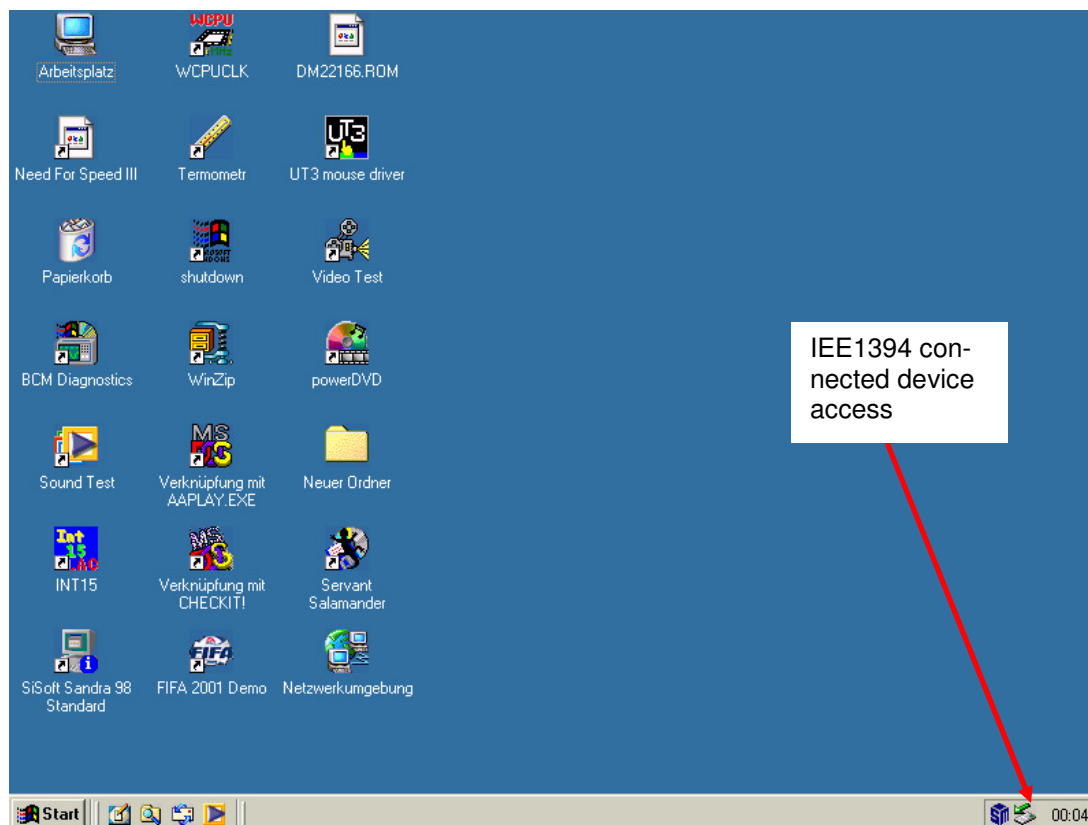
6.1.5.2 Establishing a 1394 Connection under Windows

The following steps are needed to establish a connection to 1394 devices.

- A. The device needs first to be plugged into the dedicated FW port.
- B. 1394 bus supports plug and play feature, once plugged in, the device will be detected.
- C. You can be prompted to install a driver for the connected device. Please use the provided drivers from the manufacturer. The device drivers may also be in the default driver set from your operating system and you may need the operating system source.
- D. Once the driver be installed, you should normally be able to communicate with the device.

The following figures show the installation process of a compliant IEE1394 hard-disk under Windows 2000. This is only intended as an example of IEE1394 device under Windows. As said before, your device may need drivers which are not directly provided by the OS. In that case, you will be prompted to use the available manufacturer drivers.

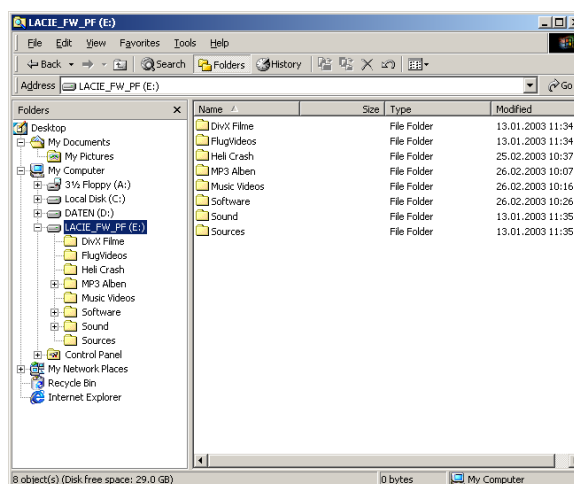
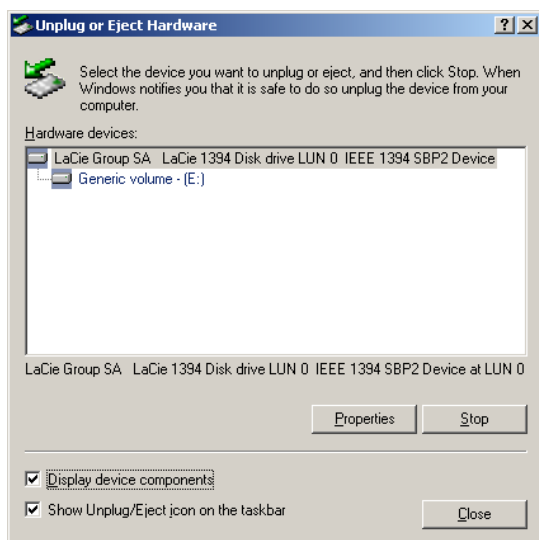
IEE1394 bus property location under Windows 2000



The following picture shows the obtained windows if the symbol be

IEE1394 connected device

Ready to use Hard-disk once installation is completed



6.1.6 Framegrabber / Video IN

6.1.6.1 MPC40/A/B

If Windows is asking for the Framegrabber/VideoIn/ Multimedia driver, you have to select the following path:

Driver: BSP CD 855: \DRIVERS\XP-W2k\VideoIN\General_BT878-Driver

You have to install this driver manually, there is no "setup.exe"

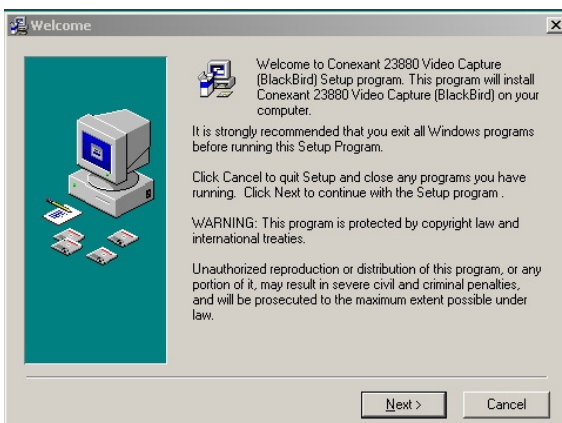
Do not use the driver located in the MPC41 directory!

6.1.6.2 MPC41

If Windows is asking for the Framegrabber/VideoIn/ Multimedia driver, you have to use the following driver::

Driver: BSP CD 855: \DRIVERS\XP-W2k\VideoIN\MPC41

You have to execute the exe file.



Do not use the driver located in the MPC40 directory!

6.1.7 Int15 emulator driver for W2k/XP

Location: BSP CD 855: \TOOLS\General-Intel855Tools\DL-INT15_Tool\WDM-Driver

How to:

Execute the file int15dl_installxx.exe



After installation of this driver you can use the tools:

WinInt15.exe (Int15 function test tool) and T855.exe (Temperatur sensor (SMBUS) monitor)

See [chapter 7.2](#)

6.2 Linux

6.2.1 Video IN for MPC40C

Kernel configuration:

Device drivers

I2C support

I2C support

Multimedia devices

Video for Linux

BT848 Video for Linux

Important: The BT848 Video for LINUX option only appears when I2C support is selected.

Compile the driver as a module as it needs to be parameterized. Load the module as:

```
# modprobe bttv card=8
```



Note...

The parameters for the other two BT878 in the system are:

```
# modprobe bttv card=8,8
```

```
# modprobe bttv card=8,8,8
```



Note...

Modern distributions include these drivers and support the MSMG104+ board “out of the box” without kernel compiling.

7 SOFTWARE

7.1 Video Framegrabber

7.1.1 AMCap 878A for WINDOWS

Location: \Drivers\MPC4x_x-MPCF40\VIDEO_IN

AMCap from Microsoft-XP is a sample application which can preview and capture input from audio / video capture PC peripherals, including (but not limited to) 1394 conferencing cameras, DV camcorders, USB microphones and webcams, and TV tuner cards. AMCap is provided in the Windows DDK as a tool for testing Video Capture drivers and drivers.

Usage

-File - AMCap can save audio and / or video as a file in the Microsoft AVI (Audio Video Interleave) format. See the DirectX documentation for additional information on AVI files

-File -Set Capture File - specify a file location for the captured file (before capture)

-File -Allocate File Space - pre-allocate a file for improved performance (generally unnecessary on PCs faster than 200 mHz)

-File -Save Captured Video As - save a captured file (after capture)

-Devices - AMCap lists the Video and Audio devices available on the menu. You can select from multiple choices

-Options

-Options -Preview – toggle video preview on / off

-Options -Audio Format – specify audio capture options

-Options -Video Capture Filter – specify video filter settings (see the DirectX SDK for additional information)
Selects PAL/NTSC or SECAM Format !

-Options -Video Capture Pins – specify video filter settings (see the DirectX SDK for additional information)

-Capture -Start Capture – start capture to file

-Capture -Stop Capture – stop capture to file (pressing the Escape key will also halt the capture)

-Capture -Capture Audio – toggle audio capture on / off

-Capture -Closed Captioning – toggle closed captioning on / off (closed caption enabled device must be available – see DDK documentation for details)

-Capture -Master Stream – specify which stream (audio, video, none) is used to synchronize the capture

-Capture -Set Frame Rate – select the frames per second for video capture

-Capture -Set Time Limit – specify a length of time for the capture to last

Complete documentation for AMCap (including source code) is in the Microsoft DirectX SDK, which is available as a free download on the DirectX Home Page at <http://www.microsoft.com/directx>.

Channel selection:

Channel 1 = internal TV-Tuner

Channel 2 = external Svideo Source (input on the rearside)

Channel 3 = not used

7.1.2 Video Framegrabber 878A for WINDOWS

Digital-Logic AG Video Grabber for 878A of MPC40 Systems

Location: \Software\Videoin

If you need other TV-Standard as PAL, than select the standard with the AMCap bevor Using this videograbber.

Selects PAL/NTSC or SECAM Format in AMCap !

The VIDEOGRABBER program is intended for showing the simple use of video input.



At the first start up of the program, it is necessary to have a driver available, which supports the capturing feature. Open dialog window „Settings“(the button “ ”) and choose the driver in the drop-down list. If no driver is mentioned, then it's necessary to close the program and to install a driver, using the Windows standard driver installation procedure.

Main window buttons assignment:



Captures single frame from the video-input and copies it to standard Windows clipboard (Ctrl+C).



Captures single frame and saves it as standard Windows graphics file (“bmp” format) (Alt+F).



Captures video-stream and saves it as standard Windows video file (“avi” format). To stop capture, press the ESC key or press the button again (Alt+G).



Plays captured video file. Pressing this button while playing stops the playing and allows you to look at any frame of the video file, using the slider under the toolbar (Alt+P).



Opens “Settings” dialog window (Alt+S).

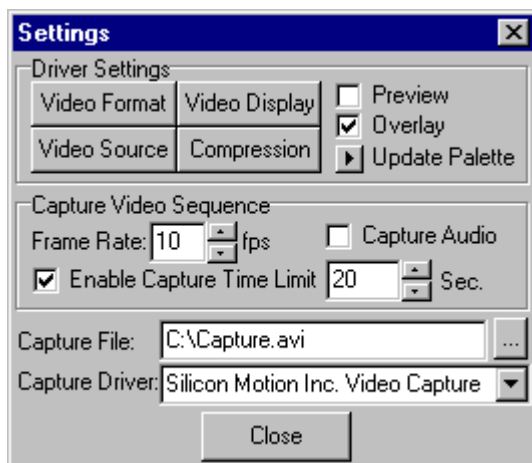


Shows this help file (F1).



Exits the program (Alt+X).

Settings



This dialog allows you to adjust picture parameters, select input video channel and set the timing values for the video capturing process.

The buttons “Video Format”, “Video Source” and “Video Display” calls appropriated dialogs for changing some parameters of the picture format such as “Brightness”, “Contrast”, image dimensions and some others.

The button “Compression” calls a dialog of video compression. This dialog box lets you specify software compression techniques during a capture session. Because software compression requires processing time, it is generally inappropriate to use it during a real-time capture, except at very slow frame rates. The RLE compression method, which requires similar processing time during capture and playback, is the only recommended method during real-time capture.

“Options”:

Preview. Sets the display area to display an image stored in the frame buffer after capture.

Overlay. Sets the display area to display the video-input signal from the hardware source (before capture).

“Capture Video Sequence”: This lets you specify parameters for the capture session and the video sequence, including the video and audio format.

There are the following options:

Frame Rate. Sets the number of frames per second to capture. More frames per second provide a better quality but require more storage space and a faster data-transfer rate. The maximum is determined by the capabilities of your capture system.

Enable Capture Time Limit. Specifies whether to capture for a preset length of time. If this option is selected, you can type a time-limited value in the Seconds box.

Capture Audio. Specifies whether to capture audio while capturing video, ensuring close synchronization between the audio and video tracks.

“Capture File”: A file created on the hard disk for the purpose of storing captured video and audio data.

Troubleshooting:

A video source for real-time capture (such as a video camera or video recorder) provides an uninterrupted stream of information to the capture hardware. The capture hardware copies each frame of the video sequence (and each portion of audio) and transfers it to the disk before the next frame of data enters the capture hardware. A video frame contains one image of the video sequence.

Real-time capture demands a fast computer and hard disk. The computer must process and store the incoming video frame before the next frame is received in the capture board. If the system gets slower, during capture, frames of video data are dropped (lost).

Note During capture, your hard disk might not keep up with the frame rate you specified. If this occurs, the program inserts blank frames where it is unable to store frame data. When the capture session is completed, the program reports the number of blank or dropped frames. Dropped frames use minimal storage space (8 bytes) and do not adversely affect audio/video synchronization.

Note: Using enough fast frame rate on a slow computer, will might cause a crash or hanging your system.

This software release has been tested on a DLAG PENTIUM 166 computer, showing good results under the following conditions:

Video format – 320x240, 8 bit.

a. Overlay “on”, frame rate = 5 fps.

b. Preview and Overlay “off”, frame rate = 8 fps.

Video Grabber (C) 2002 DIGITAL-LOGIC AG

7.2 Windows Int15 Tool

Please find the tool and the driver under:

BSP CD 855: \TOOLS\General-Intel855Tools\DL-INT15_Tool on the product CD or in the download area of the support center.

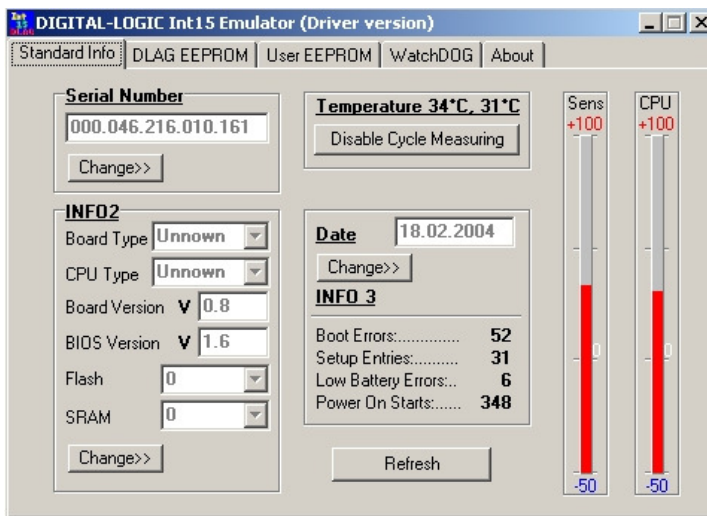
Note:

Before you can use these tools, you have to install the Windows WDM driver first.

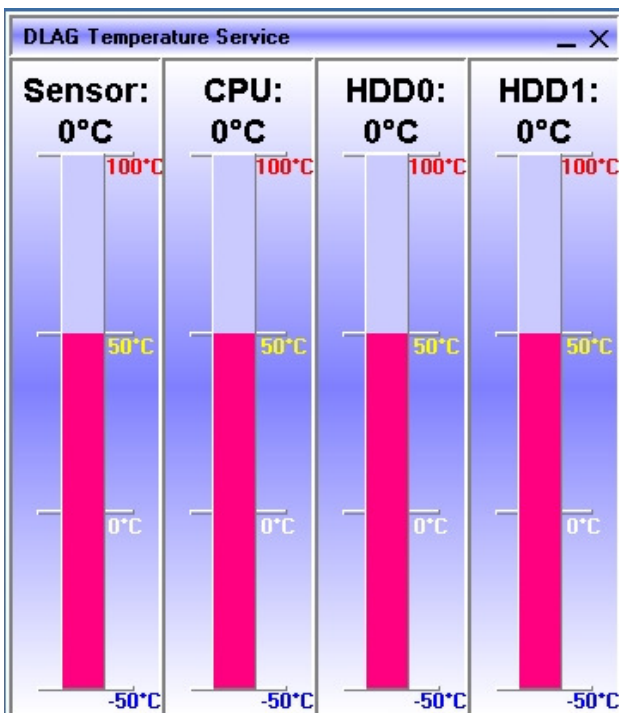
See [chapter 6.2.6](#)

7.2.1 Int15 Windows Software

- WinInt15.exe (Int15 function test tool)

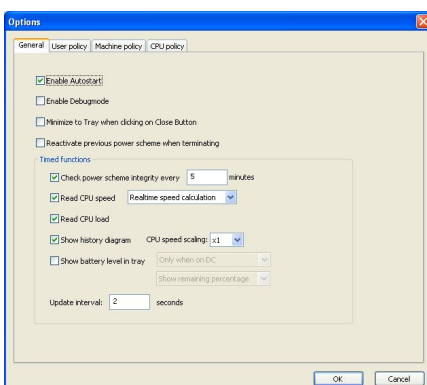
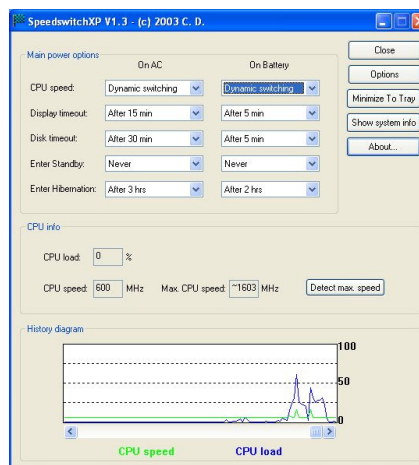
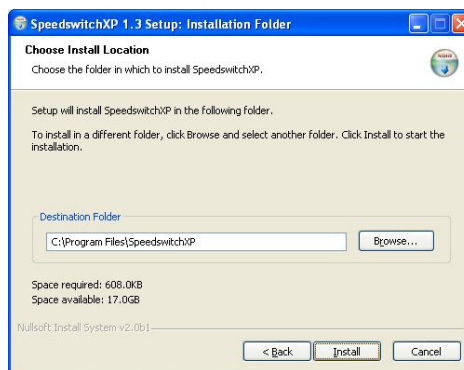
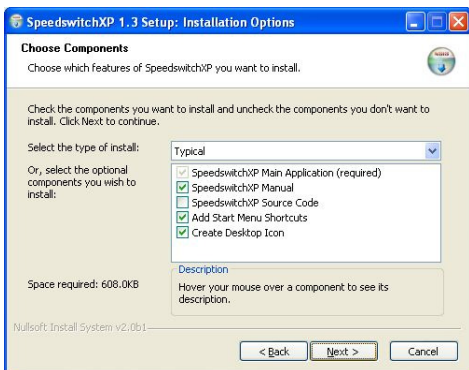
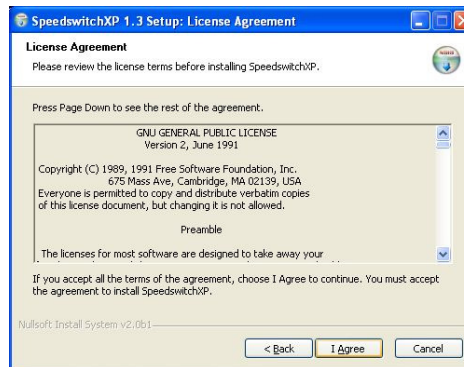


- T855.exe (Temperatur sensor (SMBUS) monitor)



7.3 Speedstep

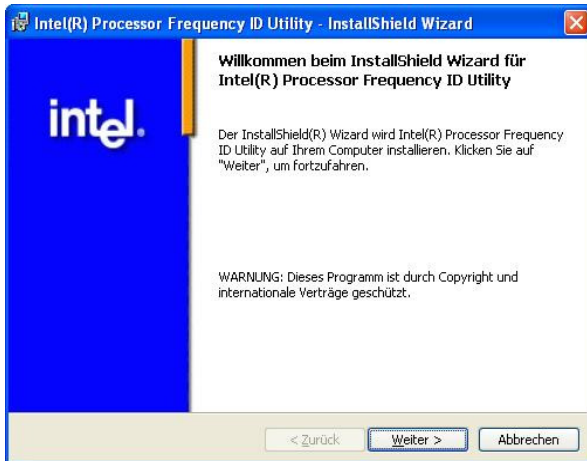
Select: BSP CD 855: \TOOLS\General-Intel855Tools\SPEEDSTEPXP
 Doubleclick on "sswitchxp130.exe". Follow the instructions:



7.4 Identification Utility

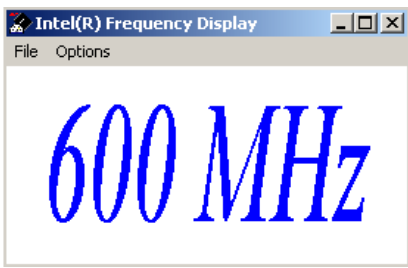
7.4.1 Processor Frequency Utility

Path: BSP CD 855: \TOOLS\General-Intel855Tools
fidenu32.msi



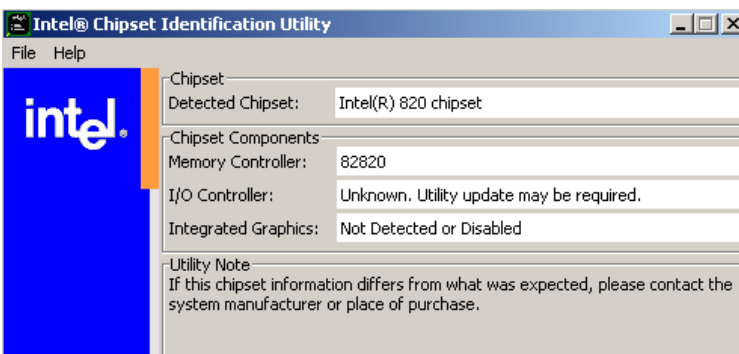
7.4.2 Frequency Display

Path: CD 855: \TOOLS\General-Intel855Tools
FrequencyDisplay202.exe



7.4.3 Chipset Identification Utility

Path: x CD 855: \TOOLS\General-Intel855Tools
CHIPUTIL.exe



7.5 Remote Control over COM Port

7.5.1 Requirements

Serial Null-Modem cable (only RX and TX)

Remote computer: Serial port address 3F8h

Host computer: Serial port COM1 or COM2, OS (Windows or MSDOS), floppy image file with MSDOS 6.22 or FREEDOS (eg. freedos2img which is located on the product CD or in the download area).

7.5.2 Limitation

OS on the Remote computer: MSDOS or FREEDOS

By enabling "remote floppy" support, all other floppy disks on the remote computer will be disabled.

7.5.3 Principles of Functionality

The main principles are based on the hooks of vectors INT10(video), INT13(disk) and INT16(keyboard) in a special (DLINT) ROM extension, which redirects the command interrupt requests over the serial COM port to the remote console running on another (host) computer under Windows or MSDOS.

During startup, DLINT ROM module try to initiate communication over COM port, if this initial communication is unsuccessful, remote access feature will be disabled. If initial connection was successful, DLINT module asks for supported options and initialize appropriated TSR vectors. Options, which are not enabled in remote console will stay native on remote computer. Remote connection was successfully established, if in the left upper corner appears a message "Press F1 for Setup".

7.5.4 Bios settings on remote computer.

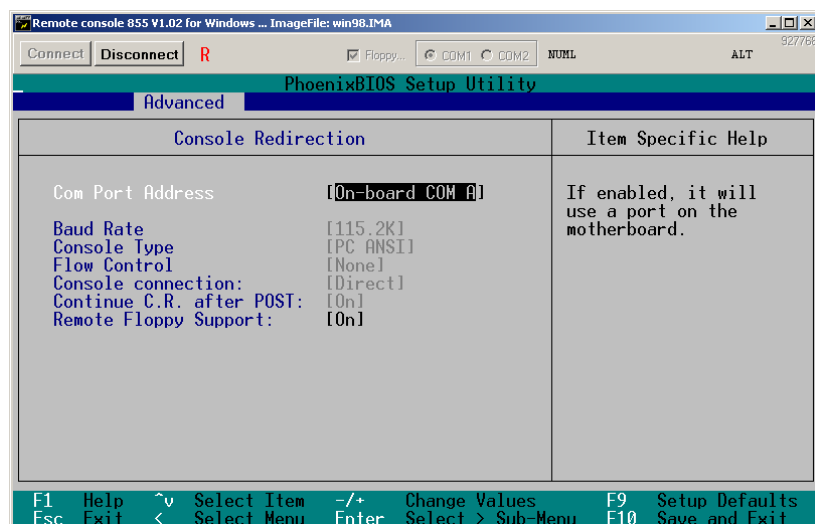
To enable remote COM port for remote control, press F2 at boot time to enter a BIOS setup.

Then enter "Advanced", "Console Redirection" and set COM port parameters and required protocol parameters.

Note1: It's possible to use any terminal emulation software on the host side, which support PC ANSI or VT100 protocol.

Note2: Remote floppy support is working under following conditions:

1. Remote console software is Digital-Logic Remote855.exe
2. Baud Rate is fixed [115.2K]
3. Flow Control [None]
4. Console connection: [Di-rect]
5. Continue C.R. after POST [On]
6. Remote Floppy Support: [On]
(turn "On" this option set all other options automatically to the proper state.



Note... All remote features are supported only under FREEDOS or MSDOS 6.22.

Note... When the remote floppy option is enabled, it's impossible to use another floppy disk; even the USB floppy is not accessible.

7.5.5 Settings on host computer.

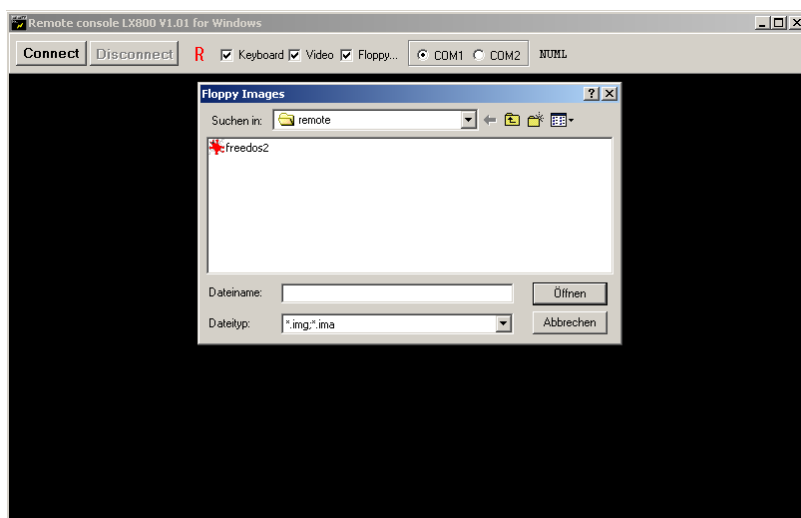


Note... Remote console application must be loaded and connected before switch on (BIOS start) the remote computer.

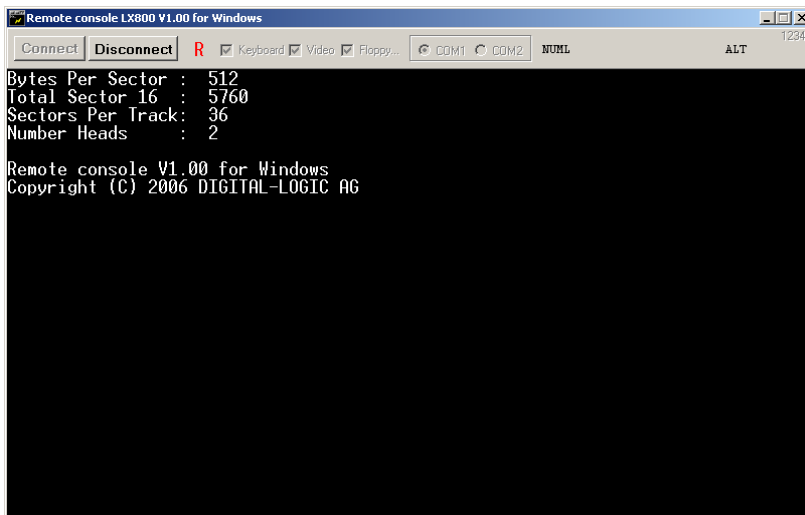
7.5.6 Windows Tool

Supported options like “Keyboard”, “Video” and “Floppy...” must be chosen before connection. Remote application simulate floppy disk access over “floppy image file”

Connect to the FreeDos Image file by enabling the option “Floppy...”:



Afterthat press “Connect”



Windows application Remote855.exe

Please, start now the remote computer.

Functions:

R – enable this option is helpful, when remote application is working in directvideo mode without using BIOS Int10 functions. Every 0.5-1 second windows application will send a request to remote computer to refresh a screen on the host computer. Eg. If you want to use the “Volkov Commander VC” you have to enable this feature.

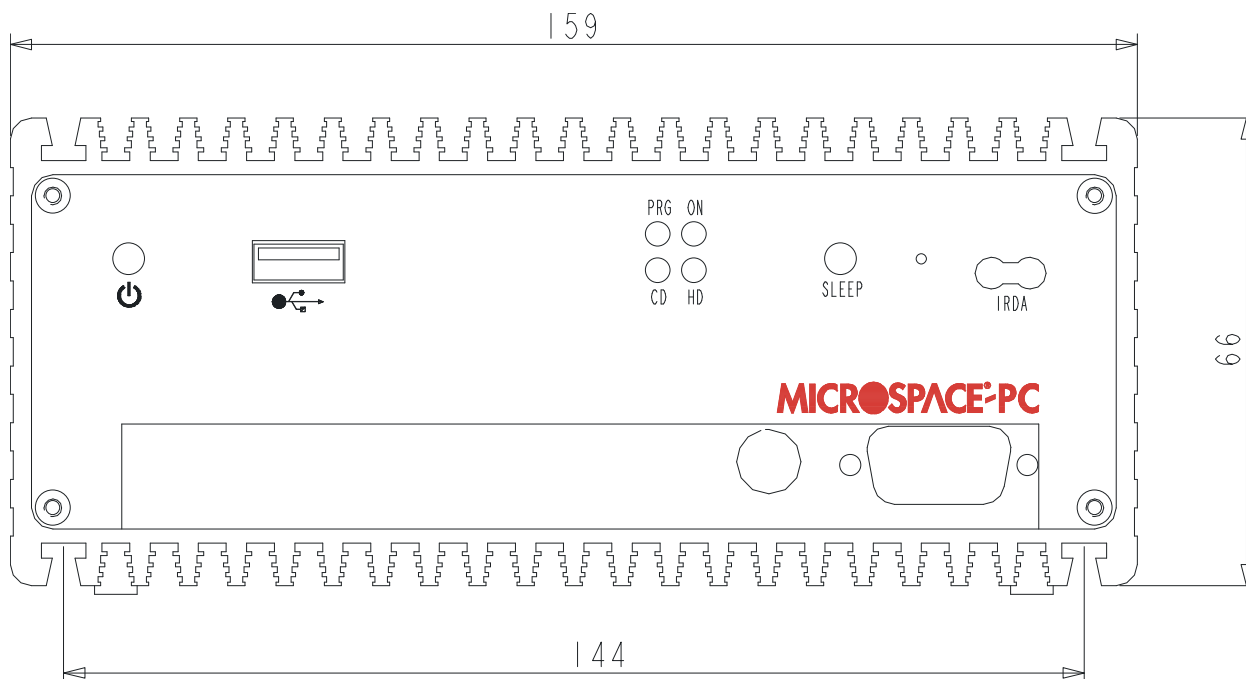


Ctrl-Alt-Del simulation. OS Windows hooks Ctrl-Alt-Del keys sequence, and to send a signal from the host console to remote computer, please press Ctrl-Alt and on-screen Del button by mouse click.

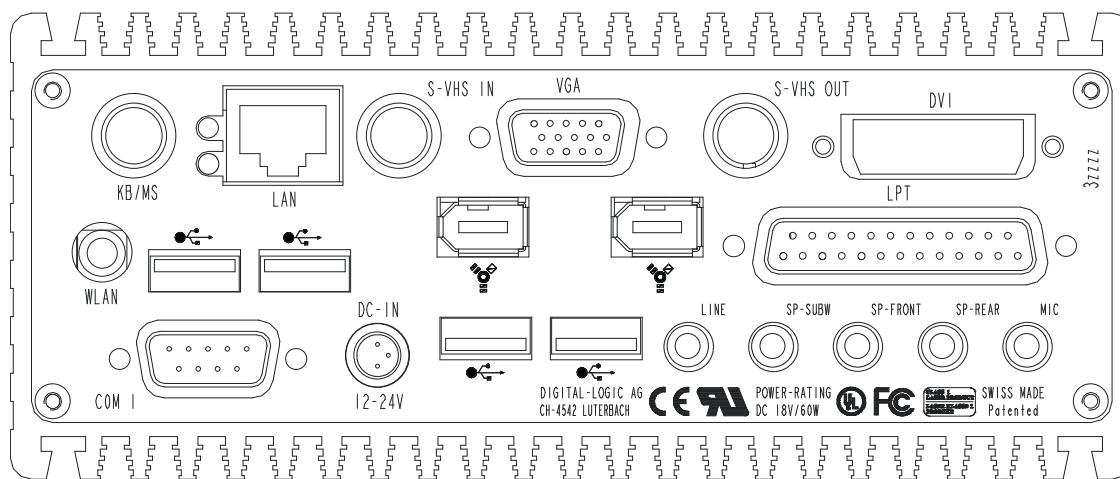


8 DIMENSIONS

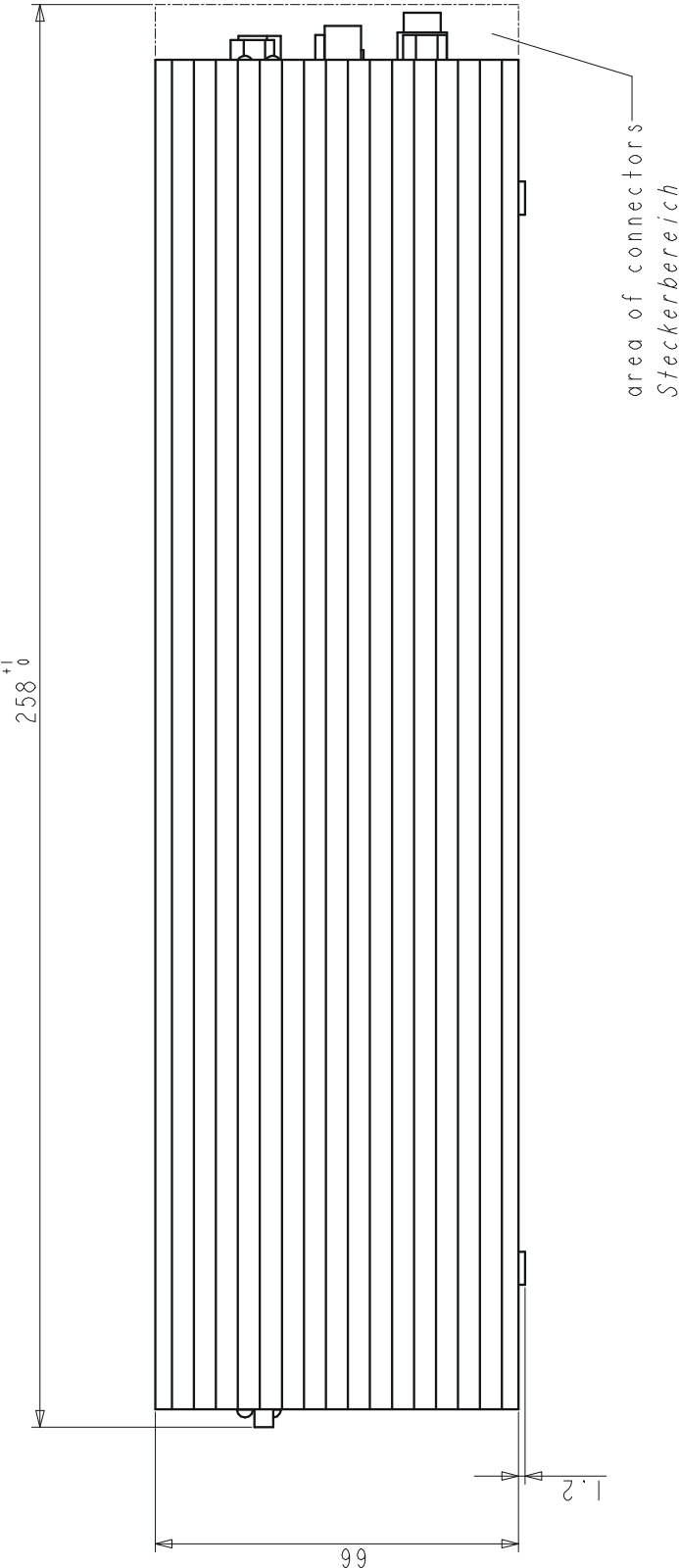
8.1 Front view



8.2 Rear view



8.3 Dimensions Closed Length



9 BIOS

The BIOS-setup menu allows several adjustments of the system which must be implemented only by skilled personal.

9.1 BIOS-History MPC40/A/B MPC41

Until 01.01.2007:

Version/ Release:	Date:	Description
1.00	Nov 03	APM Support
1.2	Oct.03	Basic version with APCI
1.5	Jan.04	Int15, Irda, Lpt, Standby functions, ACPI fixes
1.6	Feb.04	Boot from Lan, Wake up from Lan
1.7	Feb.04	IRDA fix, COM fix, Dont wait for F1 When error Message
1.8	Mar.04	New video bios implemented, Int15 modified
1.9	Mar. 04	Floppy boot / PXE boot enable
2.0	Apr. 04	Keyboard init fix, new source code for Dothan implemented, new firmware hub device support:SST49LF008A, ST50FW080
2.1	May 04	VGA bios 3276 implemented, PCI Table AD23 = RISER Card PIRQ H,E,F,G
2.2	June 04	New keyboard/mouse sourcecode; CPU speed adjustable in the bios setup
2.3	July 04	LCD support is now adjustable in the bios setup; Dothan CPU support added, ACPI fix for turn off COM1/2; LPT, Floppy and LAN under Windows
2.4	Aug. 04	<ul style="list-style-type: none"> - Ser_IRQ: new configured to "continuous mode" - SuperI/O ACPI fix: If floppy, COM1/2 and LPT are disabled in the bios setup: <ol style="list-style-type: none"> 1. the devices are disabled and invisible in all OS 2. the free DMA are usable for other resources - PCI Configuration Menu under Advanced (IRQ, DMA and UMB are reservable for ISA)
2.5	Sept. 04	<ul style="list-style-type: none"> - Keyboard init fix - Dothan MicroCode update - HPET (High Performance Event Timer) enabled - Chassis Intruder detection removed
2.6	Oct. 04	<ul style="list-style-type: none"> - ATA100 support - PCITIOISA Bridge support - Progress Bar - SMBattery Support (GPIO8 Interrupt) - VGA Bios modified to enable CRT Monitor
2.7	Dec. 04	SMBus optimized
2.8	Jan. 05	Bugfix for Pod-Code 87h if CMOS invalid and Error during Boot
2.9	May 05	CPUID für Dothan Revision C0 (CPUID 6D8) ACPI battery state, capacity and remaning time , ACPI negative temp. capture corrected
3.01	Feb. 06	<ul style="list-style-type: none"> - CRTFIX: Added Setup Item IGD - CRTFix to set the LID Switch Status. If Closed, the windows driver switch off LVDS and switch to CRT - Default Primary Video Adapter: Added Setup Item Default Primary Video -Adapter, so its possible to select wich graphic card is primary (Internal or PCI) - ACPI Fix for no Picture after StandBy - New VGA Bios Version 1235 Add resolution 800x480 for LVDS Display
3.03	Mar. 06	<ul style="list-style-type: none"> - Final Video Bios from Intel 1270 - CH4/ICH4M universal Bios - Fix for wrong SpeedStep Table if GV3

3.04	Mar. 06	<ul style="list-style-type: none">- Fix for secondary IDE (was always Removable)- Corrected detection of Celeron without SpeedStep and TM1
3.05	Nov. 06	<ul style="list-style-type: none">- Added USB 2.0 Legacy Support- Menu to select FullSpeed or HiSpeed- Disabling of USB2.0 Support fixed

9.2 BIOS-History MPC40/A/ MPC41

Since 01.01.2007:

Version/ Release:	Date:	Description
3.05	Nov. 06	<ul style="list-style-type: none">- Added USB 2.0 Legacy Support- Menu to select FullSpeed or HiSpeed- Disabling of USB2.0 Support fixed
3.09	July 07	<ul style="list-style-type: none">- PCI to ISA bridge <p>ATTENTION: Please use the command line: <i>Phlash16.exe bios.wph /mode=3</i> to download a core bios greater than V3.05</p>

9.3 BIOS-History MPC40B/C

Since 01.01.2007:

Version/ Release:	Date:	Description
3.07	Jan. 07	- PCMCIA 32Bit issue solved (Now on both slots 32Bit supported)

9.4 PMPIC-BIOS-History

Version/ Release:	Date:	Description	Remarks	File
8.0	25.6.03	Basic Version		

9.5 Activate the BIOS setup

- After turning on the device, immediately press the key:

F2

and the menu of the BIOS setup appears.

9.6 Phoenix BIOS function keys

The special keys which are used in the Phoenix BIOS are:

Action	Key
Call BIOS	F2
Change settings	SPACE / ENTER
Navigation	Pfeile
Save	F10
Terminate	ESC

9.7 Key <ESC>

Pressing of <Esc> changes to the POST screen and activates one of two functions:

- In case multi boot is installed the boot process is running to the end of POST, where the **Boot First Menu** will be shown:
 - Loading of an operating system of a bootable free selectable carrier.
 - Go into setup.
 - Leaving the Boot First Menu (with <ESC>) and loading of the operating system in the defined sequence.
 - If multi boot is not installed the process is carried out without query.

9.8 Key <F2>

Through pressing of key <F2> during the boot process change will be made onto POST screen and the BIOS setup will be displayed.

9.9 Download CORE-BIOS

Before downloading a BIOS, please check as follows:

- Make a bootable diskette including the following files:
 - DELEP855.EXE
 - phlash16.exe*
 - core BIOS (SM855_xx_FLASHABL.ROM)

Rename the SM855_xx_FLASHABL.ROM file to **bios.wph**

*** = see ATTENTION below**

IMPORTANT:

Do not use boot disks created in a Windows operating system. If you do not have a MSDOS 6.22 disk available, you can download a boot disk from www.bootdisk.com.

NOTE:

Use SM855_xx_FLASHABL.ROM for downloading with the phlash16.exe.
The bios SM855_xx.cor is only usable for external programmer.

- **Boot the DOS without config.sys & autoexec.bat -> press "F5" while starting DOS boot.**
- Disable the EMM386 or other memory managers in the CONFIG.SYS of your bootdisk
- Make sure, that the PHLASH16.EXE programm and the BIOS to download are on the same path and directory!
- Is the empty disk space, where the PHLASH16.EXE is located, larger than 64kB (for safe storage)
- Is the floppydisk not write-protected

Start the DOWNLOADING process:

1. Start the system with the bootable diskette. If you do not have a bootable diskette or floppy drive, you may can start in DOS mode by pressing the F5 key to disable the autoexec.bat and config.sys.
2. Run DELEP855.EXE to clear the CMOS and the EEPROM

IF YOU DO NOT RUN THE DELEP855.EXE, THE SYSTEM WILL BE DESTROYED DURING THE BIOS UPGRADE!

1. Run phlash16.exe bios.wph /mode=3
2. If the bios download is finished you have to power off the system
3. Power on the system and wait for the long "beep" signal
4. Power off the system again
5. After power on the system, press "F2" to enter the setup, set the default values with "F9" and save and leave the setup with "F10"
6. Power off the system
7. Now the download procedure is finished

ATTENTION!

If you want update a bios with version greather than V3.05 you have to use the following command line: **plash16.exe bios.wph /mode=3**

9.10 Error Messages (Beep Codes)

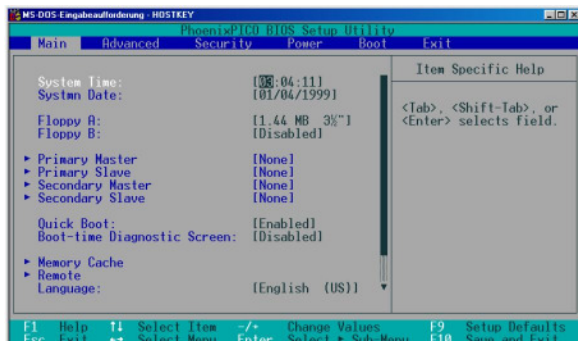
During the boot process the BIOS produces status messages in the shape of data onto Port 80H and acoustically by internal beeper in case the screen is not initialized.

PHOENIX	
1	1 x sort signal before booting (INT19H)
1-2	Search for BIOS extensions. 1x long, 2x short signal by faulty checksum.
2-2-3-1	Test at not allowed interrupt
1-3-4-1	Memory address error xxxx
1-3-4-3	Memory data error xxxx
1-3-1-1	Test memory freshening
1-3-1-3	Test 8742 keyboard controller
1-2-2-3	BIOS ROM checksum
1-2-3-1	Timer error
1-2-3-3	DMA controller error
1-3-3-1	Memory error
1-4-2-1	CMOS error, set standard value in BIOS setup

9.11 BIOS Settings

9.11.1 Quick guide:

9.11.1.1 Sub Menu „Main Choice“



In this main overview the following changes can be carried out:

Set Date/Time (see chart below)

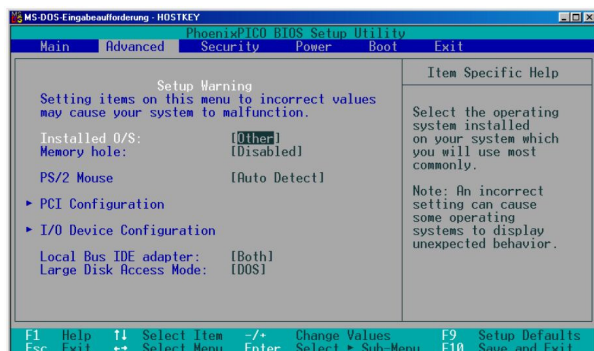
Turn on and off quick boot resp. diagnostic screen.

- Language choice between german and english.

Feature	Options	Description
System time	HH:MM:SS	Set time
System date	MM/DD/YYYY	Set of current date

9.11.1.2 Sub Menu „Advanced“

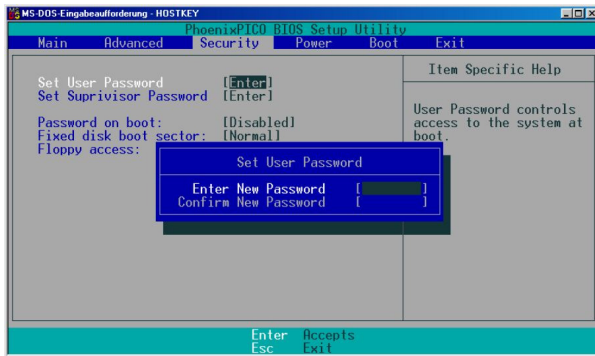
For Win95 „Installed O/S“ set <Win95>, for all other operating systems to position <other>. The BIOS requires this information for the identification of PnP under Windows 95.



9.11.1.3 I/O Device Configuration

Feature	Options	Description
Serial interface A: Seraial interface B:	Disabled Enabled Auto OS Controlled	<p>“Disabled” turns off the ports.</p> <p>“Enabled” requires a manual base address and an IRQ.</p> <p>“Auto” configures through PnP resources for the interface.</p> <p>“OS Controlled”: The BIOS leaves the assigning of the resources to the operating system and reserves no resources.</p>
Parallel Port:	Disabled Enabled Auto OS Controlled	<p>„Disabled“ turns off the serial interfaces.</p> <p>„Enabled“ requires a manual base address and a IRQ.</p> <p>“Auto” configures through PnP resources for the interface.</p> <p>“OS Controlled”: The BIOS leaves the assigning of the resources to the operating system and reserves no resources</p>
Mode	Output only Bi-directional	Output only is the standard protocol for the unidirectional operation.

9.11.1.4 Submenu „Security“



To use password security functions see following chart:

Feature	Options	Description
Setting of user password	Max. 7 alphanumeric figures	Pressing the <Enter> key summons the entering of a user password. Therewith certain settings are protected.
Feature	Options	Description
Setting of supervisor password	Max. 7 alphanumeric figures	Pressing the <Enter> key summons the entering of a supervisor password. This function allows full access to all settings.
Password on boot	Enabled Disabled	Setting „Enabled“ summons the entering of a password for boot function from floppy.

9.11.1.5 List of Supported USB Devices

Excerpt of devices tested by Digital-Logic:

Devices	Manufacture	Boot	Results
USB Floppies	TEAC Model FD-05PUB	✓	OK
USB Keyboards	Logitech, iTouch CHICONY, KU8933		OK
USB Mice	Logitech, Mini Wheel Mouse M-BE55		OK
USB CD-R-WRITERS	IOMEGA Predator USB 4x4x6 EU Acer CRW 6424MU	✓	OK
USB CD- ROMS	FRECOM FC-CD40		Failed
USB CD-R-WRITERS	HP CD-Writer 8230e		Failed
USB 2.0 CD-R-Writers	Teac DW-224PUK	✓	OK
USB-CD	TEAC-210	✓	OK
USB memory stick	ASUS BlackPerl 32MB	✓	OK
USB 2.0 memory stick	SanDisk cruzer mini (128MB – 1GB)	✓	OK
	SanDisk Micro (Misc size)		OK
	SwissBit 128MB		OK

This list is subject to a permanent update and extension.

The right column contains a not final list of the devices supported by PHOENIX

Possibly not all devices of the list are directly supported due to space problems. The service team of Digital-Logic is responsible for individual wishes of customers.

PHOENIX:

Device	Manufacturer	Interface
USB HUBS	D-Link DSB H7 (8 port) D_Link H4 (4 port) SANTE (4 port) USB MIN SIIG Hub (4 port) Belkin Express Bus (8 port) NCI Hub (4 port hub) ADS Ultra Hub (4 port hub) Friendly Net Hub (4 port hub)	Connect at least 6 USB Hub in to the Platform. Connect all USB devices to them. Most of them should be detected and function as usual.
USB Keyboards	USB BTC KB Model: 7932 USB Otronic M/N: Scorpius 980N NEC CHERRY M/N: G80_3400_100	Connect USB KB in to the USB Hub with PS/2 KB. It should function as usual.
USB Mice	USB MS IntelliMouse 1.1A USB Belkin mouse USB AVB ID: HQXPC97010_06 Interex M/N: MOSXU Logitech M/N: M_UA3T IntelliMouse Explorer	Connect USB Mouse in the a USB Hub with the PS/Mouse. It should function as usual.
USB Floppies	TEAK Model FD-05PUB TEAK Model FD-05PU Mitsumi (no model No.) Sony ITC Y-E DATA ver. 3.12 VST Model: FDUSB-M Y-E Data	Connect at least 2 USB FD in to the one of the USB Hub with the Legacy Floppy. They should function as usual.
USB ZIP Drives	IOMEGA 100 MB ZIP Drive IOMEGA 250 MB ZIP Drive	Connect both USB ZIP drives in to the USB Hub. One is functional.
USB Hard Drives	USB 2.2 GB ORB HDD USB DiskOnKey (DOK) Ver 21D	Connect both USB HDD drives in to the USB Hub and boot to DOS. They should function as usual.
USB CD-ROMS	Panasonic KXL-RW20AN 4X IOMEGA ZIP CD-ROM TEAK USB CD_ROM (CDWE54E) Addonics CD-ROM Addonics CD-RW Addonics DVD	Connect all USB CD-ROM and IDE CD-ROM as 1 st boot device and boot to DOS.
USB LS-120 Drive	Imation Super Disk LS-120 Matsushita Addonics Super Disk LS-240	Connect USB LS-120/240 and boot to DOS. Should be directly connected to the M/B.

9.11.2 Main

PhoenixBIOS Setup Utility							
Main	Advanced	Intel	Security	Power	Boot	Exit	
System Time: [08:30:33] System Date: [11/03/2005] Legacy Diskette A: [Disabled] > Primary Master [20004MB] > Primary Slaveter [CD-ROM] > Secondary Slave [None] System Memory: 640 KB Extended Memory: 514048 KB						Item Specific Help <Tab>, <Shift-Tab>, or <Enter> selects field.	
F1	Help	↕	Select Item	-/+	Change Values	F9	Setup Defaults
Esc	Exit	←	Select Menu	Enter	Select > Sub-Menu	F10	Save and Exit

9.11.2.1 HDD settings

PhoenixBIOS Setup Utility							
Main	Advanced	Intel	Security	Power	Boot	Exit	
Primary Master [20004MB]						Item Specific Help	
Type: [Auto] LBA Format Total Sectors: 39070080 Maximum Capacity: 20004MB Multi-Sector Transfers: [16 Sectors] LBA Mode Control: [Enabled] 32 Bit I/O: [Disabled] Transfer Mode:y: [FPIO 4 / DMA 2] Ultra DMA Mode: [Mode 5]						User = you enter parameters of hard-disk drive installed at this connection. Auto = autotypes hard-disk drive installed here. 1-39 = you select pre-determined type of hard-disk drive installed here. CD-ROM = a CD-ROM drive is installed here. ATAPI Removable = removable disk drive is installed here.	
F1	Help	↕	Select Item	-/+	Change Values	F9	Setup Defaults
Esc	Exit	←	Select Menu	Enter	Select > Sub-Menu	F10	Save and Exit

9.11.3 Advanced

PhoenixBIOS Setup Utility						
Main	Advanced	Intel	Security	Power	Boot	Exit
Installed O/S: [WinXP] Reset Configuration Data: [No] Large Disk Access Mode: [DOS] Local Bus IDE adapter: [Both]				Item Specific Help Select the operating system installed on your system which you will use most commonly. Note: An incorrect setting can cause some operating systems to display unexpected behavior.		
> I/O Device Configuration > Keyboard Features Cache Memory > PCI Configuration Legacy USB Support: [Enabled] Enable memory gap: [Disabled] Summary screen: [Enabled] Boot-time Diagnostic Screen: [Enabled] QuickBoot Mode: [Enabled] FirstWare Authentication Level [High]				v		
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select > Sub-Menu F10 Save and Exit						

PhoenixBIOS Setup Utility						
Main	Advanced	Intel	Security	Power	Boot	Exit
> I/O Device Configuration > Keyboard Features > Cache Memory > PCI Configuration Legacy USB Support: [Enabled] Enable memory gap: [Disabled] Summary screen: [Enabled] Boot-time Diagnostic Screen:KB [Enabled] QuickBoot Mode: [Enabled] FirstWare Authentication Level [High] FirstWare Video Mode [1024x768] FirstWare Language: [English]				Item Specific Help Additional setup menus to configure console		
> Console Redirection				^		
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select > Sub-Menu F10 Save and Exit						

9.11.3.1 Advanced IO

PhoenixBIOS Setup Utility			
Advanced			
I/O Device Configuration		Item Specific Help	
Serial port A:	[Enabled]	Configure serial port A using options:	
Base I/O address:	[3F8]		
Interrupt:	[IRQ 4]	[Disabled] No configuration	
Serial port B:	[Enabled]		
Mode:	[Normal]	[Enabled] User configuration	
Base I/O address:	[2F8]		
Interrupt:	[IRQ 3]	[Auto] BIOS or OS chooses configuration	
Parallel port:	[Enabled]		
Base I/O address:	[378]	(OS Controlled) Displayed when controlled by OS	
Interrupt:	[IRQ 7]		
Mode:	[ECP]		
DMA channel:	[DMA 3]		
Floppy disk controller:	[Disabled]		
F1 Help	↕ Select Item	-/+ Change Values	F9 Setup Defaults
F5 Exit	← Select Menu	Enter Select > Sub-Menu	F10 Save and Exit

9.11.3.2 Advanced KB

PhoenixBIOS Setup Utility			
Advanced			
Keyboard Features		Item Specific Help	
NumLock:	[On]	Selects Power-on state for NumLock	
Key Click:	[Disabled]		
Keyboard auto-repeat rate:	[30/sec]		
Keyboard auto-repeat delay:	[1/2 sec]		
F1 Help	↕ Select Item	-/+ Change Values	F9 Setup Defaults
F5 Exit	← Select Menu	Enter Select > Sub-Menu	F10 Save and Exit

9.11.3.3 Advanced Cache

PhoenixBIOS Setup Utility	
Advanced	
Cache Memory	Item Specific Help
Memory Cache: [Enabled]	Sets the state of the memory cache.
Cache System BIOS area: [Write Protect]	
Cache Video BIOS area: [Write Protect]	
Cache Base 0-512k: [Write Back]	
Cache Base 512k-640k: [Write Back]	
Cache Extended Memory Area: [Write Back]	
Cache A000 - AFFF: [Disabled]	
Cache B000 - BFFF: [Disabled]	
Cache C800 - CBFF: [Disabled]	
Cache CC00 - CFFF: [Disabled]	
Cache D000 - D3FF: [Disabled]	
Cache D400 - D7FF: [Disabled]	
Cache D800 - DBFF: [Disabled]	
Cache DC00 - DFFF: [Disabled]	
Cache E000 - E3FF: [Disabled]	
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults F5c Exit ← Select Menu Enter Select > Sub-Menu F10 Save and Exit	

ATTENTION!

If you change the red marked settings, the board will not start up anymore! Only with a external VGA board it is possible to access the bios setup to set the default values.

9.11.3.4 PCI Configuration

PhoenixBIOS Setup Utility	
Advanced	
PCI Configuration	Item Specific Help
> PCI/PNP ISA IRQ Resource Exclusion > PCI/PNP ISA UMB Region Exclusion > PCI/PNP ISA DMA Resource Exclusion	Reserve specific IRQs for use by legacy ISA devices
F1 Help ↕ Select Item -/+ Change Values F9 Setup Defaults Fsc Exit ← Select Menu Enter Select > Sub-Menu F10 Save and Exit	

9.11.3.5 PCI/PNP ISA IRQ Exclusion

PhoenixBIOS Setup Utility			
Advanced			
source Exclusion		Item Specific Help	
IRQ 3:	[Available]	Reserves the specified IRQ for use by legacy ISA devices	
IRQ 4:	[Available]		
IRQ 5:	[Available]		
IRQ 7:	[Available]		
IRQ 9:	[Available]		
IRQ 10:	[Reserved]		
IRQ 11:	[Reserved]		
F1	Help	↕	Select Item
F5	Exit	←	Select Menu
-/+	Change Values		
Enter	Select > Sub-Menu		
F9	Setup Defaults		
F10	Save and Exit		

9.11.3.6 PCI/PNP ISA UMB Region Exclusion

PhoenixBIOS Setup Utility			
Advanced			
PCI/PNP ISA UMB Region Exclusion		Item Specific Help	
C800 - CBFF:	[Available]	Reserves the specified block of upper memory for use by legacy ISA devices	
CC00 - CFFF:	[Available]		
D000 - D3FF:	[Available]		
D400 - D7FF:	[Available]		
D800 - DBFF:	[Available]		
DC00 - DFFF:	[Available]		
F1	Help	↕	Select Item
F5	Exit	←	Select Menu
-/+	Change Values		
Enter	Select > Sub-Menu		
F9	Setup Defaults		
F10	Save and Exit		

ATTENTION!

If you change the red marked settings, the board will not start up anymore! Only with a external VGA board it is possible to access the bios setup to set the default values.

9.11.3.7 PCI/PNP ISA DMA Exclusion

PhoenixBIOS Setup Utility	
Advanced	
PCI/PNP ISA DMA Resource Exclusion	Item Specific Help
DMA 0: [Available] DMA 1: [Available] DMA 3: [Available] DMA 5: [Available] DMA 6: [Available] DMA 7: [Available]	Reserves the specified DMA channel for use by on-Plug-and-Play ISA devices.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults F5c Exit ← Select Menu Enter Select > Sub-Menu F10 Save and Exit	

9.11.3.8 Advanced Console

PhoenixBIOS Setup Utility	
Advanced	
Console Redirection	Item Specific Help
Com Port Address [On-board COM A] Baud Rate [38.4K] Console Type [PC ANSI] Flow Control [XON/XOFF] Console connection: [Direct] Continue C.R. after POST: [On]	If enabled, it will use a port on the motherboard.
F1 Help ^v Select Item -/+ Change Values F9 Setup Defaults Esc Exit < Select Menu Enter Select > Sub-Menu F10 Save and Exit	

9.11.4 Intel

PhoenixBIOS Setup Utility							
Main	Advanced	Intel	Security	Power	Boot	Exit	
> CPU Control Sub-Menu > MCH Control Sub-Menu > Video (Intel IGD) Control Sub-Menu > ICH Control Sub-Menu > ACPI Control Sub-Menu > APM Control Sub-Menu CK-408 Clock Initialization: [66Mhz] CK-408 Spread Spectrum: [Disabled]						Item Specific Help These items control various CPU parameters.	
F1	Help	↕	Select Item	-/+	Change Values	F9	Setup Defaults
F5	Exit	←	Select Menu	Enter	Select > Sub-Menu	F10	Save and Exit

9.11.4.1 Intel CPU

PhoenixBIOS Setup Utility							
Intel							
CPU Control Sub-Menu						Item Specific Help	
Speed Step Technology: [GV3] Thermal Control Circuit: [TM2] DBS Cycling Temperature: [70 C]						Select the type of Geyserville support desired. If GV3 is selected, then the GV1 selection represents GV1 Plus. Manual = IST Disabled, CPU set to desired Voltage/Frequency.	
F1	Help	↕	Select Item	-/+	Change Values	F9	Setup Defaults
F5	Exit	←	Select Menu	Enter	Select > Sub-Menu	F10	Save and Exit

9.11.4.2 Intel MCH

PhoenixBIOS Setup Utility					
Intel					
MCH Control Sub-Menu				Item Specific Help	
> MCH Power Management Sub-Menu Feature Set: [MGM] DDR CAS Latency: [Auto] DDR Burst Length: [4] DDR ECC Operation: [Enabled] DIMM Clock Gating: [Enabled] MGM Core Frequency: [Auto Max] GFX Priority Auto-Precharge: [Disabled] Global WR Cache Lazy WR(B17): [Disabled] Global WR Cache Priority WR(B18): [Disabled] IOQ Normal RD Auto-Precharge(B19): [Disabled] IOQ Early RD Auto-Precharge(B20): [Disabled]				This Sub-Menu contains Setup Items which control the Power Management Features of the MCH.	
F1	Help	↕	Select Item	-/+	Change Values
F9	Setup Defaults				
Fsc	Exit	←	Select Menu	Enter	Select > Sub-Menu
F10	Save and Exit				

PhoenixBIOS Setup Utility					
Intel					
MCH Power Management Sub-Menu				Item Specific Help	
Thermal Model Usage: [Disabled] Lock Bits: [Locked]				Determine if the Static Thermal Model should be enabled for testing.	
F1	Help	↕	Select Item	-/+	Change Values
F9	Setup Defaults				
Fsc	Exit	←	Select Menu	Enter	Select > Sub-Menu
F10	Save and Exit				

9.11.4.3 Intel Video

PhoenixBIOS Setup Utility	
Intel	
Video (Intel IGD) Control Sub-Menu	Item Specific Help
Default Primary Video Adapter: [PCI] IGD - CRTFixe [Disabled] IGD - Onboard VGA: [Enabled] IGD - Graphics Controller: [Enabled] IGD - Memory type: [UMA = 8MB] IGD - Boot Type: [VBIOS Default] IGD - LCD Panel Type: [1024x768 LVDS] IGD - Panel Scaling: [Auto]	<p><Enter> selects field. Select 'PCI' to have a PCI video card, if installed, used for the boot display device.</p> <p>Select 'IGD' to have the IGD internal video used for the boot display device.</p>
F1 Help ^v Select Item -/+ Change Values F9 Setup Defaults Esc Exit < Select Menu Enter Select > Sub-Menu F10 Save and Exit	

ATTENTION!

If you change the red marked settings, the board will not start up anymore! Only with a external VGA board it is possible to access the bios setup to set the default values.

Exception: If you want to install a external VGA card on the PC104 or PC104+ BUS.

9.11.4.4 Intel ICH

PhoenixBIOS Setup Utility	
Intel	
ICH Control Sub-Menu	Item Specific Help
> Integrated Device Control Sub-Menu CPU Sleep: [Enabled] Deeper Sleep in S1M: [Disabled] PCI Clock Run: [Disabled]	These items determine whether the integrated PCI Devices will be Enabled in PCI Config Space.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select > Sub-Menu F10 Save and Exit	

9.11.4.4.1 Intel ICH Integrated

PhoenixBIOS Setup Utility	
Intel	
Integrated Device Control Sub-Menu	Item Specific Help
USB - Device 29, Function 7: [Enabled] IDE - Device 31, Function 1: [Enabled] SMBus - Device 31, Function 3: [Enabled] AC97A - Device 31, Function 5: [Enabled] Internal LAN - Device 8: [Enabled] PXE OPROM: [Disabled]	Control USB 2.0 functionality through this Setup Item.
F1 Help ↕ Select Item -/+ Change Values F9 Setup Defaults F8c Exit ← Select Menu Enter Select > Sub-Menu F10 Save and Exit	

9.11.4.5 Intel ACPI

PhoenixBIOS Setup Utility	
Intel	
ACPI Control Sub-Menu	Item Specific Help
Active Trip Point: [Disabled] Passive Cooling Trip Point: [Disabled] Critical Trip Point: [100 C] Native C-State Support: [Enabled] FACP - C2 Latency Value: [Enabled] FACP - C3 Latency Value: [Enabled] FACP - RTC S4 Flag Value: [Enabled] APIC - IO APIC Mode: [Enabled] HPET - High Performance Event Timer: [Enabled] Base Address: [0xFED0000]	This value controls the temperature of the ACPI Active Trip Point - the point in which the OS will turn the CPU Fan on.
F1 Help ↕ Select Item -/+ Change Values F9 Setup Defaults F8c Exit ← Select Menu Enter Select > Sub-Menu F10 Save and Exit	

9.11.4.6 Intel APM

PhoenixBIOS Setup Utility							
Intel							
APM Control Sub-Menu				Item Specific Help			
Cx States: [Enabled]				Control the ability to enter into CPU C-States when running an APM OS.			
F1	Help	↕	Select Item	-/+	Change Values	F9	Setup Defaults
F5	Exit	←	Select Menu	Enter	Select > Sub-Menu	F10	Save and Exit

9.11.5 Security

PhoenixBIOS Setup Utility							
Main	Advanced	Intel	Security	Power	Boot	Exit	
Set User Password [Enter] Set Supervisor Password [Enter] Password on boot: [Disabled] Fixed disk boot sector: [Normal] Diskette access: [Supervisor] Virus check reminder: [Disabled] System backup reminder: [Disabled]						Item Specific Help	
						Supervisor Password controls access to the setup utility.	
F1	Help	↕	Select Item	-/+	Change Values	F9	Setup Defaults
Esc	Exit	←	Select Menu	Enter	Select > Sub-Menu	F10	Save and Exit

9.11.6 Power

PhoenixBIOS Setup Utility							
Main	Advanced	Intel	Security	Power	Boot	Exit	
Power Savings: [Disabled] Auto wakeup time [Off] Resume On Time: [Off] Resume Time: [00:00:00] Resume On Modem Ring: [Off] Power Button Function: [Sleep] Suspend Mode: [Suspend]						Item Specific Help	
						Maximum Power Savings conserves the greatest amount of system power. Maximum Performance conserves power but allows greatest system performance. To alter these settings, choose Customized. To turn off power management, choose Disabled.	
F1	Help	↕	Select Item	-/+	Change Value	F9	Setup Defaults
Esc	Exit	←	Select Menu	Enter	Select > Sub-Menu	F10	Save and Exit

9.11.7 Boot

PhoenixBIOS Setup Utility							
Main	Advanced	Intel	Security	Power	Boot	Exit	
Removable Devices +Hard Drive CD-ROM Drive Network Boot						Item Specific Help	
						Keys used to view or configure devices: <Enter> expands or collapses devices with a + or - <Ctrl+Enter> expands all <Shift + 1> enables or disables a device. <+> and <-> moves the device up or down. <n> May move removable device between Hard Disk or Removable Disk <d> Remove a device that is not installed.	
F1	Help	↕	Select Item	-/+	Change Value	F9	Setup Defaults
Esc	Exit	←	Select Menu	Enter	Select > Sub-Menu	F10	Save and Exit

9.11.8 Exit

PhoenixBIOS Setup Utility

MainAdvancedIntelSecurityPowerBootExit

Exit Saving Changes
Exit Discarding Changes
Load Setup Defaults
Discard Changes
Save Changes

Item Specific Help

Exit System Setup and
save your changes to
CMOS.

F1 Help ↑↓ Select Item -/+ Change Values
Esc Exit ← Select Menu Enter Select > Sub-Menu

F9 Setup Defaults
F10 Save and Exit

10 Q&A – QUESTIONS AND ANSWERS:

Problem:	Solution:
There is no picture after changing values in the menu "DISPALY PROPERTIES -> Settings":	<p>You have to press the following key combination to get a picture again:</p> <p>CTRL+ALT+Fx</p> <p>Fx:</p> <p>F1 = VGA F2 or F3 = SVIDEO F4 = DVI</p> <p>We recommend to change the settings in the Intel garphic menu: "DISPLAY PROPERTIES -> Settings -> Advanced -> Intel -> device properties"</p>
The computer does start up automatically	Please refer to chapter 4.5 Power on (Startup modes)
Strange behavior of the system during the boot up the OS or during using the system	Enter the bios setup and set the primary IDE channel to "user" (instead "auto"). Change the value "Ultra DMA Mode" = "2"
After changing the hardware to a newer revision or version with the IHC4, Windows get a blue screen during the boot up	You have to install the Windows again (New installation of the OS)
Sound Quality	<p>Note:</p> <p>To have a better sound quality please configure the "Sound" as follows:</p> <ul style="list-style-type: none"> - enter the menu settings - enable the "AUX" input in the playback device area <p>Mute the following inputs: AUX, CD-Player, Phone, Line IN</p>

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